AMERICAN JOURNAL of VETERINARY MEDICINE

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PUBLISHED MONTHLY. CHICAGO, U. S. A.

VOL. XIV JULY, 1919 NO. 7

Infectious Abortion*

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INFECTIOUS abortion is one of the oldest diseases on record. It is also the most important disease from an economic point of view that exists in this country today, and it is becoming more widespread each year.

Bovine abortion is an infectious disease, manifested by mammitis, metritis or retained placenta, and abortion in the cow; white scours and infectious pneumonia in calves.

The disease occurs in practically all countries where cattle are bred, and is far more prevalent than is generally suspected. Dairy herds seem to be more subject to the disease than the beef herds; this is perhaps due to stable feeding, housing, and the close confinement which they are more often subjected to, but the infection may become widely spread in range animals.

The introduction of the disease into herds causes heavy losses because of the fact that a number of the most valuable calves perish, and because of the decrease in the milk production; also some of the cows conceive only with difficulty after aborton, or may become sterile.

Cause and Modes of Transmission

The disease is caused by the Bacillus abortus, a short Gram-negative, non-sporulating organism, that is easily destroyed by antiseptics. It is not hereditary, but is a congenital disease. Infection may take place from the external genitals, in which case it is transmitted usually during copulation by males, who have previously covered infected cows; or it may be spread by the straw, floors and other surroundings becoming contaminated with the vaginal discharge during and after abortion, or by the amniotic fluid, and the fetal membranes, which contain enormous numbers of bacilli.

Apparently the infection more frequently than otherwise is taken into the digestive tract with the feed, which has become contaminated from the various sources of infection. It is very probable that animals may in this way take up considerably larger quantities of the infection than through the genital organs.

Calves born of cows infected with B. abortus carry the infection; they may contract the disease either before or after birth, especially do they contract the infection by sucking or drinking milk from infected cows.

A large percentage of cows infected with B. abortus harbor the germs in the udder and eliminate the organism through the milk. Hundreds of cows so infected do not abort, but are carriers of the disease and scatter the infection by the milk. The mammary gland seems to be the normal reservoir for the B. abortus which may be carried to other parts of the body by the blood and lymph streams. The digestive tract is no doubt the principal avenue through which the infection gains entrance.

*Presented at the meeting of the Missouri Valley Veterinary Medical Association, February, 1919.

Non-infected herds are frequently infected by the introduction of an already infected female, which, during abortion, infects the premises and during copulation infects the bull. The infection then spreads with every favorable opportunity, since the first cases of abortion or premature birth are given very little attention, and they are followed by new cases only after a considerable period, and the necessary measures to eradicate the disease are overlooked. The disease can also be introduced by animals that suffer from chronic uterine catarrh subsequent to abortion, and by animals that carry the fetus to full term, in spite of their being infected. Occasionally the disease is introduced by males that have recently been covering cows in infected herds, or by new-born animals from such farms. As a rule, the infection spreads only among animals of the same species; at times, however, animals of other species are attacked.

Mares occasionally abort simultaneously on farms where cattle are affected, infection producing abortion in mares, about the eighth month of pregnancy.

The infection which reaches the vagina passes into the uterus where it multiplies on the surface of the mucous membrane and later also on the fetal membranes. The bacteria that reach the vagina during pregnancy are perhaps capable of passing the mucous plug of the neck of the uterus, but perhaps they more often reach the uterus by way of the intestinal canal, and blood stream, either before or after conception. This is one of the organs that is an exceedingly favorable medium for the growth of this organism. The infective material produces an inflammation, as a result of which, an exudate later becoming purulent, forms between the mucous membrane and the chorion, which causes a partial detachment of the fetal membranes. As a result of the loosening and detachment of the fetal membranes, abortion may occur in various stages of gestation.

Abortion reduces the susceptibility to infection. Cows abort quite frequently a second or a third time, but further abortions are exceptional.

Symptoms

The afterbirth in a small percentage of cows has a normal appearance, but as a rule the afterbirth in cattle manifests subchorial edema of a yellow gelatinous infiltration, which might involve only restricted areas, although in some cases the entire mass might be involved, and here and there be covered with mucopurulent flakes, or in various places it may be thickened, the vessels dilated, and sometimes surrounded by small hemorrhages. The abortion usually is preceded by moderate swelling of the lips of the vulva, the vaginal mucous membrane becomes reddened, and small reddish nodules appear on the surface. Sometimes there appears from the vagina a mucous or mucopurulent, odorless, yellowish-gray discharge. Occasionally an arthritis can be observed which manifests itself by twitching of the extremities, and frequent lying down of the animal. Fetuses aborted at early periods of gestation are usually dead, and as a rule in these cases the fetal membranes are expelled together with the fetus. In abortions taking place at a later stage of gestation the calves are born alive, but usually die within a few hours, or one or two days. It is in these cases that we have trouble with the placental membranes, as it is a common occurrence to have them retained for some time.

The diagnosis of infectious abortion is substantiated by the above cited anatomical changes of the fetal membranes and the fetus, as well as by the microscopic demonstration of the B. abortus and the agglutination test.

Treatment and Control

The question arises, what is the best plan of controlling this disease:—First, in a herd in which there is limited infection; that is, in a herd in which the infection has produced only disturbance in calves, such as (a) pneumonia, (b) white scours, (c) umbilical infection.

In those cases I would advise only the ordinary sanitary methods, which would consist of cleaning up the premises and the use of bacterin, both in mature animals and in the calves.

Second,—How proceed in herds in which the infection produces metritis of sufficient gravity to result in retained placenta and an occasional death of the cow from septic infection, but in which the living calf is produced in practically every instance.

(*Continued on page* 342)

Dysentery in Adult Cattle*

By B. L. Lake, D.V.M., Teutopolis, Ill.

ENTERITIS or gastro-enteritis is the pathological condition on which to base all considerations of dysentery. We shall first consider collectively the various etiological and pathological ramifications of the basic entity, viz.: gastro-enteritis; hemorrhagic or ulcerative enteritis, commonly known as dysentery or bloody flux; catarrhal enteritis, occurring in both acute and chronic forms; croupous or pseudomembranous enteritis also known as moor-ill or wood-evil; coccidiosis or red dysentery; distomatosis; helminthiasis; white scours in calves—"dysentery neonatorum"; tuberculosis, especially the intestinal form; Johne's disease or pseudotuberculosis; rinderpest, a European disease, has not been reported occurring in America; anthrax; hemorrhagic septicemia as it occurs in the intestinal or mixed forms; irritation, thermic, mechanic, and chemic, both organic and inorganic.

The form that is most commonly and generally understood by the name dysentery, especially in adult cattle, and that the veterinary practitioner is usually called upon to handle, is hemorrhagic enteritis. It occurs with great frequency and is widely distributed in both the sporadic and enzootic forms, but it never assumes an epizootic character.

Etiology

The various infections and infestations of the intestines referred to as producing among others some clinical symptoms of dysentery are of course caused by their specific bacteria, parasites or protozoa.

The enzootic form occurring in adult cattle is at the present time considered by nearly all good authorities to be caused by a specific microbe as yet unknown, or probably by a mixed infection of the specific microbe with some otherwise well known common bacteria with either one as a primary invader, the other playing a secondary role.

The sporadic form may with all brevity and propriety be declared due to irritation: either thermic—as heat and cold; mechanic—such as pointed, sharp-edged or coarse food, and foreign material; and chemic—organic and inorganic toxins.

In many cases, however, infection follows primary irritation.

Symptoms

Constitutional. Marked and increasing weakness and prostration, moaning and expressions of internal pain, cessation of rumination, diminished or lost appetite. In the early stages the animal is thirsty but later it takes very little or no water; temperature 104 to 105° F. with a drop below normal and fatal termination; pulse small, weak and accelerated.

Local. Eyes are sunken and show lacrimation, mucous membranes injected becoming icteric and blanched on approaching death. The abdomen appears gaunt and is sensitive to pressure, especially on the right side.

The first day or two the feces are tarry and black and scanty; a pronounced diarrhea then develops, the feces become entirely bloody, becoming increasingly fetid. Defecation is at first followed by strong tenesmus but later becomes involuntary.

Occurrence. The sporadic form may occur at any time and place, in animals on grass as well as those on dry feed. In this country it seems most prevalent in early spring and in late summer.

The enzootic forms may be most common in stall-fed cattle at a certain time and in a given territory, while at another time or in another territory it may be equally prevalent under grazing conditions. Usually adult cattle are attacked on dry feed, and young stock and calves on grass. The difference between the sporadic and enzootic forms is not always the same.

Course. Mild cases usually recover within a week; severe cases may continue for three weeks and then either recover or die, while very acute cases die in from two to four days.

Prognosis should be based on the cause and severity of the individual case. It is most favorable in the enzootic forms, often running only 1 to 5 per cent mortality, but the average mortality of all cases is about 50 per cent.

*Read at the Illinois V. M. A. meeting, Chicago, December, 1918.

Pathology

The lesions are mainly in the large bowels, but frequently the small intestines also show additional lesions, and more rarely the abomasum may be involved.

Macroscopic. Inflammation of the mucous membrane of the affected portion of the intestines, varying in degrees of intensity, more or less hemorrhagic into the lumen and sometimes portions of the bowels completely filled with coagulated blood. The feces may be sanguineous in part or throughout, is often separated from or mixed with mucopurulent material, and in the later stages may contain necrotic material. The mucous membrane may show ulceration and in extreme cases even perforation of the mucous, muscular and peritoneal coats of the intestines with consequent and septic peritonitis, both visceral and parietal.

Microscopic. Degenerative changes of all affected tissues and innumerable putrefactive micro-organisms.

General Treatment

One should endeavor first to ascertain as nearly as possible the cause, form and stage of each individual case and govern the treatment accordingly.

Hygienic. Animals with diarrhea should be isolated and placed in sanitary quarters and made as comfortable as possible. Daily disinfection should be carefully done during the course of the disease, and a general cleaning and disinfection upon disappearance of the disease from the premises.

Dietetic. A moderate amount of clean wholesome water should be allowed, but all food should be withheld for one or two days. Feeding should begin with wholesome liquid or semi-liquid concentrates, which must be strictly non-irritating, gradually returning to full and regular feeding as improvement is noted.

Biological. Where a specific bacterium or a definite group of mixed infection can be demonstrated as the causative agent, a counteracting bacterin or vaccine should be employed with the least possible delay on all exposed animals as well as on all reasonably hopeful cases. Thus, where an outbreak of hemorrhagic septicemia proved to be the intestinal form, it should be most successfully combated with the bovine hemorrhagic septicemia bacterins now on the market.

Medicinal. The customary initial purgative should be used where there is evidence of irritating material of some nature in the stomach or bowels. It is also materially helpful in overcoming infecting bacteria and casting off toxins formed by them. For this purpose oils or salts should be administered. Chemical poisons should be overcome as far as possible with the best available antidote.

Vegetable poisons also should be combated by their special antidotes if any are known, otherwise probably the best results are obtained with aluminum sulphate and potassium permanganate combined, or the latter alone is often sufficient.

In infestations by parasites one should use the most effective medicament known against the particular parasite suspected or known to be present.

Cause Frequently Unknown

The vast majority of cases that are submitted to the practitioner for treatment are sporadic occurrences in which the particular cause or origin cannot be definitely determined, or cases in an enzootic outbreak. While almost certainly known to be caused by a mixed infection, the particular germs are not known and therefore we cannot use any biologic as either a preventive or a cure. In this group of cases the treatment is necessarily confined to medicinal intestinal antiseptics and antifermentives. For the control of severe pain one may use analgesics as chloral hydrate, but strong astringents or agents that suppress peristalsis should not be used under any circumstance. I have employed naphthalene as an intestinal antiseptic during the last year with exceptionally good results. The 60-gr. tablets now on the market are easily administered by placing them well back on the animal's tongue one at a time. They are then readily swallowed. In stubborn cases, they may be rinsed down with a good swallow of water. In an average sized cow, the dose should be 2 drams every three to six hours, during the day, according to severity. Usually one to three days' treatment will completely overcome all diarrhea and foul odor of the evacuations. The patient may then be put on stomachics and constitutional treatment until recovery is completed. To avoid complications and other losses to the owner from too protracted a convalescence, constitutional treatment must be persisted in to the end.

Passive Hyperthermia*

By W. H. Bailey, D.V.M., St. Joseph, Mo.

PASSIVE HYPERTHERMIA is occasionally met with in practice, and no doubt the members here today are quite familiar with its pathology. The writer is much impressed with the rather common occurrence at times of this condition in hogs which are handled in transit.

The fact that at the very time the nation was earnestly striving to conserve food, hogs died of this condition in numbers sufficient in some instances to supply the pork need for that day of the city to which they came, caused the writer to select this topic.

Nothing new is offered; simply an effort has been made to review more or less well known facts as concisely as possible. It will perhaps be permissible to deal first with the physiology of animal heat.

Animal Heat

1. OXIDATION:

(a) Numberless metabolic processes of the body are responsible for the production of animal heat. Chemists show that oxygen is a very active element in many of the phenomena of nature, that its affinity for other elements excels by reason of its unlimited range of physiochemic activity.

(b) Oxidative processes are chiefly of two types, analytic and synthetic. In both, energy in the form of heat is either consumed or eliminated. If a definite compound of given weight be oxidized so rapidly as to produce the physical phenomena of light and heat, or so slowly that such is not noticeable by the ordinary senses, it is found that the same quantity of oxygen is consumed and the same number of heat units is eliminated or consumed as the case may be. Thus for example a given log will require the same amount of oxygen for its oxidation and produce the same amount of heat whether it is burned in an hour in a great fire or whether it decays in the forest during a period of ten years.

(c) If we reason from analogy, we are prone to think that metabolic oxidation lies between these two types. However, there is really much difference by reason of the complexity of oxidation as it occurs in living bodies.

Physiologists have proved that the tissue cells are much concerned in oxidation of food. Thus, they have shown that this type of oxidation is brought about by intracellular enzymes, oxidases. Without further reference it may be concluded that the living oxidative processes are of a separate type, extremely complex, peculiar to organic chemism, and that in all cases the tissue cells use oxygen only when the proper intracellular enzymes are present to activate these processes.

(d) It is found that about the same quantity of heat is produced in the oxidation of carbohydrates and fats within the body as without, while one-third of the available energy in protein escapes from the body in urea and other excretions, a point which is valuable in the study of animal nutrition.

2. THE BODY TEMPERATURE:

(a) This varies in the different species. The temperature of cold blooded animals (poikilothermal) depends upon the external temperature, while that of warm blooded animals (homoiothermal) is within wide limits independent of the external media. Hibernating animals are warm blooded in summer and cold blooded in winter. They go into the winter sleep with their food supply stored in the form of fat; oxidation occurs very slowly and if the winter is not too severe or prolonged they easily survive. They emerge from the hibernating stage quite emaciated.

(b) The temperature varies in different parts of the body. The skin temperature is the lowest; oral temperature lower than rectal; arterial temperature higher than venous. The warmest blood is hepatic, while the coolest is found in the periphery. Body temperature is lowest in the morning and highest in the evening. There exists a physiologic reason for each of these simple facts.

(c) Carbonaceous diet, retention of waste and excessive metabolism as in fevers are potent factors in the elevation of body temperature.

*Read before Mo. Valley Veterinary Association, Kansas City, Feb. 11, 1919.

3. MAINTENANCE OF NORMAL TEMPERATURE:

(a) Normal body temperature is maintained to a degree of constancy, though of course always with slight variation. There is continual production (thermogenesis) and dissipation (thermolysis) of body heat. The proper balance (thermotaxis) between these functions insures almost constant temperature.

(b) Normally, with each change in external temperature, there occurs equivalent adjustment of heat production and elimination. If an excess of heat within the body is produced by increased muscular and other metabolic activity, there is a tendency toward excessive elimination of it. Circulation and respiration are increased, blood flows freely to the periphery, the sweat glands become active and heat is eliminated by radiation, conduction and evaporation. Without proper adjustment of heat production and elimination, the temperature would increase about one degree Fahrenheit every thirty minutes and death occur.

(4) PRODUCTION OF ANIMAL HEAT:

(a) This is the result of the combined activity of all the tissues in the body. Muscular tissue being the major tissue in volume, weight and activity, consumes the maximum amount of food and oxygen. Muscles are always active; even in a state of rest they are slightly contracting and relaxing (muscle tonus). The nervous system controls muscle activity according to physiological need. The chilling induced by going suddenly from a warm room out into severe cold without proper clothing is a physiological act. The muscle activity in such a chill produces more heat and sometimes enables the body to fully compensate for the heat lost in the cold, so that after a while it does not suffer.

(b) Thus, muscular activity produces the maximum of body heat and as muscles are controlled by the nervous system, heat production becomes analogous to gland secretion. Likewise heat elimination is analogous to other waste excretion.

5. ELIMINATION OF BODY HEAT:

(a) This, taking place by radiation, conduction and evaporation amounts to about 85 per cent of the total amount eliminated. Twelve per cent is eliminated by the warming of inspired air and by evaporation from the lungs. About three per cent is eliminated by urination, defecation and in the warming of ingested food.

(b) Radiation of heat from the body is similar to that from a stove. The larger the surface area, the greater the radiation. However, external conditions affect the degree of heat radiated. For instance, with air and water of the same temperature, it is found that water will facilitate greater conduction of heat. This explains the reason why a bath is so cooling in summer and why water holes, wet-sand bedding, etc., are of value for the well being of hogs during this season. Also everyone has noted the sudden chilling and reduction of vitality which so often occur in animals unaccustomed to radical changes from warm to cold. The haggard appearance of animals that have stood all night in cold rain and wind, is familiar to all.

(c) Conduction of heat from the body depends upon the physical condition of the animal's hair. Wet hair often conducts heat too freely as noted in (b). The heavy winter coat of hair or fur peculiar to lower animals, answers the same purpose as the winter clothing of man. It retards conduction and particularly radiation.

(d) Elimination of heat by evaporation of sweat and water from the lungs is important. It is much affected by the degree of atmospheric humidity. A dry atmosphere assists, while a very humid atmosphere retards evaporation. This is very noticeable in animals that sweat freely from the skin.

(e) Animals that do not sweat freely, exhale more water vapor. The hog sweats only from the snout. In warm weather he perspires rapidly. More hogs die in transit when the temperature is 90° to 95° F. and the air heavily saturated with water vapor, than when the temperature is 100° F. or more and the air is very dry. Thus, climatic conditions are important factors in sunstroke, (passive hyperthermia).

The Condition of Passive Hyperthermia

(a) This is a condition wherein heat dissipation is retarded by external physical factors and the body's physiological control of compensatory heat regulation fails. In severe cases, heat accumulates rapidly within the body and death occurs. The

condition is marked by high temperature, respiratory distress, semi-paralysis, convulsions, etc.

(b) In hyperthermia, the heat regulating mechanism is compensating to its full capacity and is often unable to comply with the excessive demands made upon it. The limit of physiological compensation is exceeded in those cases that die.

(c) Not all of a given species are affected equally; only here and there individuals are severely affected. Whether death follows hyperthermia, depends upon the animal's power of adaptation (thermotaxic compensation) and the persistence of the etiological factors.

Predisposing Factors in Hogs

(a) Because of excessive fat developed at the expense of muscle tissue, the cardiac and respiratory power in these animals must be very much less than that of cattle and horses.

(b) Over-loading in cars with foul, dusty or decomposing bedding, more or less rustling, shoving, and bumping, incident to transit, and also careless feeding and handling prior to loading, are a few of the predisposing causes. It is a deplorable fact that the average layman seems to think the hog capable of more exertion than it really is.

Experimental Hyperthermia

(a) If warm blooded animals are kept in chambers which are well ventilated with temperatures ranging from 96° F. to 104° F., it is observed that they die in from one to three days or ten to thirty days. The body temperatures range 103° F. to 107° F. or more.

(b) The pulse and respiration are increased, respiration finally becoming difficult. The hemoglobin of the blood is reduced and degenerative changes occur in the heart, liver and kidneys. The liver and kidneys are very important organs in eliminating waste which if retained would cause death through auto-intoxication. The heart is the engine of distribution of food to the tissues by way of the blood and lymph. The blood after giving up nutrition to the tissues, takes up waste from them and carries it to the liver. The liver then acts upon it chemically and gives it back to the blood which then carries this waste to the kidneys and the skin, and some of the gaseous waste to the lungs, for excretion. Thus it is very certain that any damage to such organs is serious when structural changes and impaired function occur.

Cause of Death in Hyperthermia

(a) This may be a combination more or less of the following:

1. Cardiac failure, due to overheated blood or undue thickening of it by excessive loss of fluid in perspiration and respiration.

2. Auto-intoxication, caused by retarded and retained excretions.

3. Excessive muscular fatigue, embracing both cardiac and skelatal.

4. Asphyxiation, caused by cardiac and respiratory insufficiency in compensation.

The Lesions of Hyperthermia in Hogs

(a) The lesions are those of a general asphyxia; occasionally they may be very slight. Much depends upon the length or course of the disturbance. The blood is very dark and practically uncoagulable. The veins are distended with blood. At times the venous congestion is very well marked in the mesentery region. The lungs are very dark purple in color, and are passively congested. The liver, heart and kidneys present degenerative changes. The heart is usually marked with large ecchymoses on the epicardium, and engorged with blood.

(b) It is to be noted that the post-mortem picture is simply asphyxia. Hogs that die of asphyxiation due to causes other than hyperthermia, present practically the same lesions except that the degenerative changes are usually not so marked.

(c) It seems that the diagnosis of "asphyxiation" is the most practical in all cases that show the lesions as noted, whether the cause is passive hyperthermia or not. The absence of pleurisy helps to distinguish the condition from acute pneumonia.

NOTE: This is in reference to those cases in which no clinical history can be obtained, as in the autopsy of hogs that have died in transit.

Mixed Infections of Swine*

By W. F. Brownlee, D.V.M., Kirkwood, Ill.

MY endeavor is to discuss mixed infections of swine from a practitioner's standpoint and in the language common to most of us, minus the technical and high-sounding lingo so prevalent with laboratory pathologists and bacteriologists. Furthermore, I am going to try to cover the subject as I have found it in my personal practice citing personal experiences and describing conditions as I have found them diagnosing and treating these diseases or diseased conditions in swine.

In the past, we as a rule failed to recognize, or rather failed to differentiate between hog cholera and other diseases of hogs, and with the advent of anti-hog-cholera serum and its use in the prevention and treatment of hog cholera, every failure was a serum or virus break, supposedly. Many herds have we revaccinated, in which, with very few exceptions where actual breaks did exist, the hogs kept on dying just the same.

I have believed for years that disease existed among hogs that had no relation to hog cholera and that anti-hog-cholera serum was all but useless in treating such diseased herds. At one time in my career I had a large quantity of human typhoid vaccine prepared by a Chicago laboratory, and I shot this into herd after herd of sick hogs and I got, or thought I did, some wonderful results for a time, but like every other brainy maneuver I ever attempted, it fell down and with its failure I again settled into the old rut.

About two years ago I "came to again," and now have accomplished in my community among hog raisers as positive a recognition of these disturbances as in hog cholera. Under the names of lung trouble, pneumonia, "flu," etc., my clients not only recognized these diseases as different from hog cholera but are now convinced that they may be successfully treated and also prevented. If this had not come about, this year would have been my last in the vaccinating game, for nine out of every ten herds in my locality, vaccinated and non-vaccinated, have had some type of mixed infection. I am, and I know of many other veterinarians, who are treating sick herds (mixed infection outbreaks) and getting phenomenal results. Some of these herds had been simultaneously vaccinated and some had not, and some never received serum and virus after vaccine treatment and have gone on and to the market without further trouble. I believe that serum and virus, and especially virus, cause an outbreak where an infection has lain dormant or has not been detected prior to simultaneous vaccination, and there is no doubt in my mind that such cases have in the past been considered serum or virus breaks.

Wonderful results, like miserable failures, are soon heralded about the neighborhood, and with the results we have obtained during the past year, there has been established a recognition of both treatment and prevention of these mixed infections, and at the present time I am treating ten hogs for these disturbances where I treat one for hog cholera or its prevention.

The recognition of these disturbances and the success we have had in treating them has justified serum and virus vaccination, otherwise the vaccination results of the last year with serum and virus unaided, would for me at least, have come to an unhonored end because all the trouble would have been laid at the door of simultaneous vaccination.

Differential Diagnosis Essential

The diagnosis and differential diagnosis of these conditions are essential and although sometimes difficult, careful study and investigation as to history, surroundings, clinical symptoms and autopsy findings usually make a positive diagnosis possible.

I shall not attempt a technical discourse on differential diagnosis for it is out of my line, and furthermore I feel that the veterinarians of Illinois know acute hog cholera when they see it and it is my desire that they learn to treat and prevent these other diseases.

Sanitation is a prime factor in the control and treatment of these conditions. Get the animals on to new ground away

*Paper read at Illinois V. M. A. meeting, Chi., Dec., 1918.

from old straw stacks and filthy wallows. To get a farmer to really clean and disinfect a dirty hog lot is a feat I have never been able to accomplish, so I insist on getting the entire herd away from the old lots and on to new ground, either before treatment or as soon after as possible.

Relative to conditions found in sick herds, I wish to say that I do not believe all are due to infections. For instance, occasional attacks of diarrhea in sucklings may be successfully treated by giving the mother a large dose of salts, through her milk straightening up the pigs without other treatment. Again, sometimes when hogs are turned into the corn fields in the fall the owner will call and tell you that he has some hogs off which are thumping, have a cough, refuse to eat, etc. Many of the cases will straighten up by dieting for twenty-four or forty-eight hours and go on without further trouble. These cases I believe to be simply dietary disturbances in the beginning but by predisposing the animals a specific infection may be allowed to gain a foothold.

Of the diseased conditions found, and especially this year in my locality, pulmonary disturbances predominate; however, necrotic enteritis and other infections, which I presume come under the head of necrobacillosis, exist. Occasionally a case, septicemic in nature, accompanies some one of the above-named disturbances. These septicemic cases simulate hog cholera, but as a rule show a characteristic difference in the hemorrhages found in the respective tissues, which makes a diagnosis possible when the history of the case is considered in detail.

The virulence of these infections varies considerably, probably due to the existing infection and to the varying resistance of the animals attacked. I have found that I get quicker and better results in treating the acute conditions than I do in those of a more chronic nature.

As to treatment for these infections of swine, I have proved to my satisfaction that there is a vaccine that will get results. This is not an advertising campaign, however, so I will mention no names. The dosage and method of administration of the product are important factors in obtaining results. I have adopted a method of giving at least two doses at five to six-day intervals, the second dose increased one-third or more over the first. I find that single injections of any such product may get temporary results, but often in two or three weeks the whole procedure must be repeated or the client may feel that he has been stung. Two injections are universally successful and, personally, I believe it all wrong to advocate a single dose, regardless of the fact that many do.

It has been my experience that an immunity is established by this method of treatment which lasts until the hogs are ready for market or become more or less naturally immune, due to age and increased resistance to such infections.

I cite in conclusion a few representative cases which I have taken from my records in an attempt to show the average results, including both successes and failures.

Case No. 1. Herd 90 head, 160 pound nonimmunes, all visibly ill. Owner suspecting cholera, could not get a car for shipment. When called made a diagnosis of mixed infection of a septicemic type. Autopsy revealed pneumonic lesions with hemorrhages on lungs and adjacent lymphatics. Gave 1.5 c.c. vaccine followed on the fifth day with 2 c.c. One died after treatment, remainder recovered.

Case No. 2. Herd 60 suckling pigs, general unthrifty condition, coughing, thumping with some diarrhea. Premises very unsanitary. Several had died. Gave 0.5 c.c., but failed to retreat until fourteenth day. Herd made a marked improvement, but suffered a relapse in three weeks when I again retreated, giving 1 c.c. repeating on the fifth day with 1.5 c.c. October 1st 35 of the original bunch were doing fine under the same unsanitary conditions. This case along with a number of others has convinced me that a single dose is unreliable and in many cases is simply lost unless followed in due time with a second injection.

Case No. 3. Herd of 100 spring pigs from immune sows. Symptoms, coughing, thumping, some scouring; these conditions existing over a period of two weeks. Twenty-five had died. Seventy-one were given 1 c.c. vaccine and removed to a clean field. Second injection was not given because of marked improvement and owner refusing to bother to get them up for re-treatment. Results were, one dead and seven runts after treatment.

Case No. 4. Herd 140 shoats, nonimmune, coughing, thumping and in bad condition. Gave 1.5 c.c. vaccine, repeating on the fifth day with 2 c.c. Herd did fine until the fourteenth day when 4 were discovered sick. In these I made a diagnosis of hog cholera and at once gave the herd serum and virus. Forty died, the balance doing fine. Owner said he thought the serum was a little old.

Case No. 5. Herd 120 immune hogs from National Stock Yards. Had been on premises three weeks. Eight had died and the remainder of the herd was in bad condition. Symptoms of pneumonia accompanied with extreme weakness and rapid loss of weight.

Gave two treatments of vaccine with a loss of two. The remainder straightened up and did fine.

Case No. 6. Carload of stock hogs shipped from Kansas City. Three or four were dead in the car on arrival. One died on the way to the farm. Fifteen were placed by themselves to die and part of the remainder were visibly off. Gave two treatments with a total loss of two following treatment, the herd straightening up in fine shape. Investigation as to the origin of these hogs showed that most of them were test pigs from serum plants and had been vaccinated two months or over, which should be proof of their cholera immunity.

Case No. 7. Herd 125 Hampshire pigs farrowed in March, simultaneously vaccinated July 15. October 18, owner noticed 8 or 10 visibly ill. October 22 I was called and found 30 or 40 sick. October 23, nearly every hog in the bunch was off and from a clinical standpoint, hog cholera was very much in evidence.

The symptoms were thumping, weakness, tucked up appearance, lame in joints, in some individuals, the joints were swollen, temperatures taken were as high as 106.2 degrees. Two were killed for autopsy which revealed slight pneumonic lesions, associated with hemorrhages on the surface of the lungs and in the submaxillary, bronchial and mediastinal lymph-glands, small and diffuse in character. All other viscera were apparently normal.

Diagnosis: Pulmonary mixed infection associated with a septicemic disturbance. Gave two treatments of vaccine of 1.5 and 2.5 c.c., respectively. Results were one dead after treatment and a wonderful clean up in the remainder with every hog in good shape by the tenth day.

Diagnosis and Treatment of Necrobacillosis in Swine*

By G. L. Watters, D.V.M., El Paso, Ill.

NECROBACILLOSIS is a specific infectious disease, caused by the Bacillus necrophorus, and characterized by inflammation and localities necrosis. It is commonly known in pigs as canker sore-mouth, infectious sore-mouth, bull-nose, or sniffles.

This condition is of common occurrence in one form or other in various parts of the United States and in other countries. In certain localities it has caused even greater losses than hog cholera. Mr. W. J. Carmichael, in charge of the pork production campaign in Illinois for the Bureau of Animal Industry, and observing conditions in different sections of the state, estimates the loss from this disease at 30 to 60 per cent of the young pigs on some farms, and in one county the loss was estimated at $20,000 to $30,000.

The Bacillus necrophorus which causes this disease, is a natural inhabitant of the alimentary tract of healthy swine. It thrives in filth, about damp and unclean barns, dirty hog wallows and insanitary places. The bacillus will not attack healthy intact tissue, but is a secondary invader. Once the tissue has been impaired by disease or mechanically injured in any way, a channel of entrance into the body is readily afforded. Suckling pigs are especially susceptible immediately following farrowing, during teething or the first few weeks of life, as the infection gains entrance through impaired tissue or injury inflicted by sharp teeth or tusks on the surface of gums, tongue, and cheeks.

Necrobacillosis assumes many different forms, the most common of which are: necrotic stomatitis, enteritis, rhinitis, pneumonia, and dermatitis.

Necrotic stomatitis, commonly known as sore mouth, usually occurs in suckling pigs, and is manifested by a local circumscribed lesion of the lips, tongue or cheeks. There is deep tissue destruction accompanied by the formation of a dry, yellow exudate, covered by a brown scab. The affected areas may coalesce and form diffused patches. The lesion has a characteristic offensive odor. Pigs which are affected generally show a rough coat and emaciation. Death depends on the extent of auto-intoxication present.

Necrotic stomatitis may extend to the nasal cavities, causing necrotic rhinitis, commonly known as bull-nose or sniffles. Necrotic rhinitis may be caused by the entrance of the Bacillus necrophorus at the time of ringing. In this form the schneiderian membrane shows lesions characteristic of necrotic stomatitis. Sometimes it affects the bone tissue, resulting in fibrous proliferation and deformity of the parts. The

*Paper read at Ill. V. M. A. meeting, Chicago, Dec., 1918.

animal so affected, sneezes, coughs and occasionally expels bloody material containing shreds of tissue.

Another common form is necrotic enteritis, which frequently accompanies hog cholera. The lesions are most common in the mucous membrane of the intestine, near the ileocecal orifice, which usually remains intact but becomes coagulated, mealy or caseous. The ulcers may be mistaken for hog-cholera infection, they also may be observed in hogs suffering from hog cholera, but as a distinct, secondary infection. I generally differentiate between the two diseases, upon the fact, that in necrotic enteritis, the areas involved, are non-elevated and diffuse, while in hog cholera the ulcers are circumscribed and project above the surface of the intestinal lining.

The symptoms in these cases, when the lesions are extensive, are diarrhea and indigestion. Later the appetite becomes diminished and the animals become unthrifty, emaciated and weak. This form usually runs a chronic course.

Another very common form is necrotic pneumonia which is frequently an associated condition of necrotic rhinitis, the infection taking place by the inhalation of necrotic particles from the nose and throat. This disease is manifested by the usual symptoms of croupous pneumonia. The very offensive odor of the expired air characterizes pulmonary necrobacillosis.

Necrotic dermatitis, another common form of the infection, is usually observed about the face, legs and feet. Abscesses may also be observed in the regions of the forelegs, thigh and neck, also in the hocks and stifle, and incision elicits a yellow, creamy pus or a dry cheese-like substance.

In my observation of this disease, the majority of outbreaks of this trouble have occurred among un-vaccinated herds. As to treatment, in this disease as well as many others, the simple and effective method to adopt is the one of prevention, as a single animal suffering from any form of necrobacillosis may contaminate the quarters and endanger future litters. Therefore all incurable cases should be destroyed and all those showing symptoms isolated. The excrement of all affected animals should be mixed with quicklime and spread upon pastures not used for swine. Hog-houses, feeding troughs, etc., should be thoroughly cleaned and sprayed with a 3 per cent solution of compound cresol, or its recognized equivalent. Wallows should be drained and filled in, and I would emphasize that these hog-wallows, or so-called mud-holes, constitute one of the biggest drawbacks which a hog-raiser has to contend with in combating this disease. For example I will cite a case where a client of mine had only about 30 head of suckling pigs and as fine a lot as one would wish to see. Two weeks after I had last seen them he called me to his farm, saying he was losing all of his pigs with what he called cholera. On visiting his place I found that the pigs had been wallowing around in mud and several of them were about to die. All were breathing heavily and throwing off a very offensive odor.

On postmortem of one of them I found lesions characteristic of necrotic pneumonia. I suggested that we remove the mother and pigs from their previous quarters to an orchard nearby, and give each pig 2 c. c. of Royal mixed infection vaccine. To this he consented, and except for three pigs lost before treatment, he had not a single loss after treatment, although two of the pigs were very much emaciated for some time, due, I think, to not getting sufficient nourishment from the mother.

As to the drugs indicated in necrobacillosis, the government states that the following has been used and found beneficial: copper-sulphate one part; hypo-sulphite of soda four parts; charcoal two parts; common salt six parts; giving one heaping teaspoonful of this mixture to every 100 lbs. of live weight in slop or milk, morning and night, for about a week, in conjunction with the mixed infection vaccine.

In conclusion, I wish to state that it is very necessary that a practitioner thoroughly examine the herd which he intends to double treat for hog cholera, for if one vaccinates a herd affected with necrobacillosis he will surely have troubles of his own very shortly, and it will be the same old story, with which we are all familiar, "Poor serum or virus or incompetent work." If the owner wishes to vaccinate and you find his herd affected with necrobacillosis, I would advise using the mixed infection vaccine ten days previous to vaccinating, and I think you will be well repaid for your extra precaution.

Mixed or Simple Bacterins, Which Shall We Use

By Edgar B. Carter, Indianapolis, Ind.
Director of Scientific Work, Swan-Myers Company

WE are living in a fast age; ideas, conditions, everything, is changing rapidly and if we fail to keep up with the advancement, we shall most surely be left behind. But when progress is made by such leaps and bounds, it is a difficult matter to keep abreast of the times, especially if a man is forced by necessity to earn a living on the side. Not only is it difficult to keep informed, but unless a man is able to hear a great variety of opinions, it is almost impossible for him to maintain an even balance in his own ideas.

Our knowledge of the mechanics of immunity has changed greatly within the last few years; things which we formerly accepted as truths, we now know to be entirely wrong. We no longer look upon immunity as a phenomenon, but rather as a definite physiological and chemical response which in a measure can be directed and controlled. And yet the very discovery of the fact that immunity was not what we thought it to be has left us with a sad realization that even yet we know very little about it. We have learned what immunity was not,—now we must learn what it is. Fortunately, we are learning in a very definite manner, and our newfound knowledge is taking us farther and farther away from the speculative and bringing us nearer to a practical working knowledge of the specific treatment of disease. In this process of making over our knowledge of immunology, it is quite natural that there should arise differences of opinion; and quite naturally, a man hearing only the ideas of one individual is apt to agree pretty much with that individual, even accepting as facts, the beliefs of the other man.

All Evidence Should Be Heard

There are some men today who say that they do not believe in mixed bacterins—and they are good men of long experience in the laboratory differentiation of diseases. Certainly their beliefs are based on observed phenomena and the actual observation of their experience, and most certainly their beliefs, like all beliefs, are deductions which may be more or less logical and more or less scientific. And we must admit that these men are entitled to believe whatever they please—and so are we. But before we definitely commit ourselves we must hear all the evidence, get the other ideas and then decide for ourselves what we shall believe. If we believe in mixed bacterins, then we should use them, but if we believe that the idea is all wrong, then by all means we should stick to the simple bacterins; at least until circumstances cause us to change our minds.

The objections to mixed bacterins are all founded on the idea that the body cannot effectually respond to more than one stimulation at a time—that a single immunity can be produced better than one effective against several organisms. The belief is largely founded on the fact that hogs receiving virus and serum frequently succumb to other diseases, due to a lowered resistance on the part of the animal body. In other words, the virus which stimulates the formation of anti-bodies makes a direct tax on the resistance of the body and for the time being renders it more susceptible to bacterial invasion. So some have reasoned quite logically that if the immunization response of the body to hog cholera virus is such a tax as to lower resistance to other organisms, the same condition would hold regardless of the immunizing agent.

But are all immunizing agents the same? Are virus, living organisms, and bacterins of similar nature? Virus alone will cause disease; it is virulent blood serum, perfectly soluble or diffusible in blood serum. Bacterins contain germ bodies but dead ones, killed by special chemical methods; and the bacterial bodies are not in solution, but exist as saline suspensions which slowly undergo lysis within the animal body and thus make very little tax on the natural resistance of the animal. The improperly called "vaccines" come more within the class of the virus, for although the organisms are sometimes attenuated they are still living and naturally make the first demand upon body vitality before the antibodies may become available for combating the real infection.

So while it cannot be denied that the immunization of animal bodies with virus or living organisms (vaccine) does call for considerable exertion on the part of the patient and while it would seem desirable that this effect be not strained to include a multitude of organisms; it must be admitted that the same conditions do not apply to the immunization with bacterins.

Medical Corps Endorses Mixed Bacterins

Early in the war the Medical Corps of the United States Army satisfied itself of not only the practicability but of the desirability of immunizing with mixed bacterins; they eliminated the practice of separate immunizations for typhoid, paratyphoid A, and paratyphoid B infections and combined the three organisms into a mixed bacterin.

Cecil and Austin, also of the Army Medical Corps, had no hesitancy in mixing not only the various types of pneumococcus, but the Streptococcus hemolyticus and Streptococcus viridans in their pneumonia bacterin; while the better known Rosenow of the Mayo Foundation, made his influenza bacterin a regular "shotgun" mixture and certainly, after all his valuable contributions to the field of bacterin therapy, we cannot pass lightly over his work.

It is true that the Council of Pharmacy and Chemistry of the American Medical Association has always frowned on mixed bacterins; but it is indicative to note that it now gives its official sanction to the more simple mixed bacterins. Certainly they cannot change their ideas all at once.

We must admit that there is a place for simple bacterins and if we are to keep "on the band wagon" it seems that we must likewise admit a just place for mixed bacterins. As to when each kind shall be used is a separate question, but the vast majority of veterinarians seem to have solved this question to their own satisfaction, and the market offers a liberal supply of either kind.

But, in the light of our present knowledge it would seem that a wholesale condemnation of mixed bacterins is not only uncalled for, but that it is decidedly unscientific.

Anthrax and Its Control*

By William L. Gates, Clarksdale, Miss.

THE fact that we have anthrax with us every year is proof sufficient that we should always be on the lookout for new methods of combating it. I shall proclaim no new methods or ideas, either in the prevention or treatment of this malady, but shall discuss a few of the measures commonly employed in the handling of this or any other contagious or infectious disease, dealing only with the practical side of the problem.

Anthrax is an infectious disease caused by a specific germ, the anthracis bacillus, and one of the oldest diseases of which we have any record as affecting live stock. As far back as the sixteenth century we have reports of outbreaks in European countries. Practically all animals are susceptible to anthrax; man is also liable to infection.

For many years anthrax was thought to be beyond the control of man. But thanks to the successful efforts of Pasteur and other noted scientists it can now be placed under absolute control and no doubt could be entirely eradicated if a continued, systematic war were inaugurated under government control, including continued, compulsory vaccinations year after year in all infected localities. If a campaign were waged as systematically as has been employed in the eradication of the Texas fever tick the economic losses from this disease could be reduced to a minimum. It is well known that that part of Missisippi known as the Delta, and parts of Louisiana and Arkansas have not been free from annual outbreaks of anthrax for a good many years. The very lax methods of handling the disease and disposal of the carcasses of infected animals for years and years has established infection in certain localities so extensively that vigorous efforts will have to be employed to prevent the annual recurrence of anthrax in those districts. Strict preventive measures must be put in force if the live stock industry is to be spared the loss of thousands of valuable animals each year.

*Read at meeting of Mississippi State Veterinary Medical Association, Feb., 1919, Greenville.

The symptoms of anthrax are manifested in the animal in various ways. In some cases the animals die within a few hours after the first symptoms appear. In other cases the disease may take a prolonged course and the animal die after being affected from three to seven days. In some cases in which the apoplectic form appears the animal may drop dead as if with a convulsion and without showing any outward appearance of the disease. In some cases the animal may recover after being affected for ten days or two weeks. The temperature usually runs high, sometimes reaching 107° F. The animals have no appetitie and soon become very weak. There is sometimes a bloody discharge from the natural openings of the body before or after death and the urine may be tinged with blood. In some cases there are local swellings of the legs, belly or throat and sometimes the head is swollen as in an advanced case of glanders.

Diagnosis Based on Post-Mortem Lesions

Post-mortem lesions reveal very positive information upon which we may base our diagnosis. In making an autopsy in an animal supposed to have died from anthrax we should always take into consideration the danger of becoming infected ourselves. The blood has a black tarry appearance and does not coagulate. The spleen is greatly enlarged, being in some cases three or four times its normal size. Hemorrhages may be noticed in various parts of the body and collections of a jelly-like substance under the skin. The carcasses of animals dead from anthrax soon become inflated with gas, due to rapid decomposition.

It sometimes becomes necessary to differentiate anthrax from Texas fever, black leg or hemorrhagic septicemia. The chief difference between anthrax and Texas fever is that the blood in anthrax is very thick, dark and resembles tar, while in Texas fever it becomes thinner and there is no change in the color. In blackleg the swellings crackle under the pressure of the finger, due to the presence of gas in the tissues. The blood in a carcass dead from blackleg appears to be normal and will coagulate. The spleen does not become enlarged as in anthrax. The principal lesions in hemorrhagic septicemia are hemorrhages under the skin and the lining membrane of the abdomen and chest. These hemorrhages vary in size from a mere speck to the size of a half dollar. They also appear in the capsule of the spleen.

In order to handle an outbreak of anthrax properly it is absolutely necessary to be able to recognize the symptoms in the living animals. It is also very important that we be able to detect the post-mortem lesions. This can only be done by one who has considerable knowledge of anatomy. It is important in controlling and eradicating a contagious disease to employ a man who has had particular training in that line of work. I see no reason why an experienced and properly trained veterinarian should not be selected to render this service. The veterinarian, if selected to handle this or any other contagious or infectious disease, should upon the arrival at the infected premises proceed with diligence and special care in the diagnosis of the trouble. No time should be lost, every effort being made to prevent further loss to the owner. On the other hand, one should not be too hasty and thus make a serious mistake in diagnosis, the possible results of which we all should realize. In the diagnosis of anthrax it is often necessary to consult the bacteriologist, for very few veterinarians who are busy all the time in general practice, should attempt to make a diagnosis upon their microscopic findings. The proper use of the microscope is a profession in itself. A history of the case should be obtained, also information as to the prevalence of the disease in the locality before and as to time since any deaths occurred. Learn if it was a severe outbreak or just a few cases here and there, how many cases recorded, what percentage of deaths, method of handling, how much territory was infected, kind of stock infected, and especially method of disposing of the carcasses. In fact learn all that is possible as to the history of any previous outbreak. If the former outbreak of this disease was in charge of any one other than an experienced veterinarian, and very lax methods of handling were in evidence, which is very likely in such cases, prepare for a severe outbreak.

The next step is to inform the owner of the infected stock that he has a contagious

disease to deal with on his premises and give him proper advice as to vaccination and quarantine measures. The owner of the infected stock is the man to whom you owe your first consideration. He should be apprised of the fact in such a way that he will readily understand the danger of having such a disease among his live stock and the probabilities of infection of human beings. On the other hand, one must avoid sending a shock of terror to his heart that will paralyze his senses and thereby destroy the best means of eradicating any contagious disease, i. e., the cooperation of one's client and his confidence in one's ability. These two assets go hand in hand and one cannot exist without the other.

In an outbreak of anthrax one must impress upon the mind of one's client the danger of the possible infection of other men's live stock. Let him know from the beginning that he is not the only man who has rights in the matter. If he is a man of common sense he will follow instructions to the letter and cooperate with you in every way possible both for his own benefit and that of the community in which he resides. But some men are very obstinate and refuse to take advice from any one. Sometimes these men can be handled by using a little diplomacy, but if they steadfastly refuse to get in line, the only thing to do is to secure the services of an officer with the proper papers and settle the matter in the courts. If one proceeds in the right way to handle these cases one can usually make a friend of the man who thought he was being persecuted. He will soon learn that any man who will persistently disregard the rights of his neighbors and his own interests by refusing to adhere to the rules of hygiene and sanitation regarding the control and eradication of contagious diseases is considered as an enemy to himself and a menace to others about him. He will also learn that the veterinarian in charge of the outbreak knew what to do and when to do it and had no favorites in the matter. From that time on he will be your best friend because he knows you will do your duty.

The state veterinarian should be notified of any outbreak of anthrax. It is required by law and much valuable advice can be obtained from this source. In serious outbreaks he will visit the infected premises and render assistance that could not be obtained elsewhere. Also in serious outbreaks of this disease one should consult the board of supervisors in the infected locality. They are authorized by law to make financial allowances to defray the expenses in such cases, and if properly approached will lend all assistance possible.

There are at present various methods of vaccination for the prevention of anthrax. The simultaneous method if considered from all points is no doubt the most efficient. This method consists in the injection of a potent anti-anthrax serum on one side of the animal and of an attenuated spore vaccine on the other side. This method requires only one handling of the animal, doing away with that dreaded return trip on the tenth day required by the Pasteur method. Another advantage of the simultaneous method is the immediate protection that it gives, reducing the losses considerably.

The curative properties of the anti-anthrax serum treatment of infected animals is now an established fact. This serum has passed out of the experimental stage and it is safe to use it in serious outbreaks and expect a reasonable percentage of the cases to recover if the serum is administered at the proper time and in sufficiently large doses.

Major Ora P. Davis, U. S. A., Division Veterinarian, 5th Division and Captain George E. Butin, V. C., Assistant Division Veterinarian, 5th Division, who came to France in April, 1918, with the 35th Division and upon the return of the 35th Division to the States, were assigned to the 28th Division and upon their return to the States, were sent to Headquarters Second Army, after which they were assigned to the 5th Division in the Army of Occupation.

INFECTIOUS ABORTION

(*Continued from page* 328)

Use the above methods mentioned but I would also recommend segregation of animals until there is no further discharge from the genital organs. The length of time that discharge persists after abortion or expulsion of the living fetus in such cases varies, from ten to twenty days; only an occasional case continues for a considerably longer period.

There is danger of such cows becoming sterile, and the line of treatment indicated would consist in the removal of all inflammatory products from the uterus at three-to six-day intervals, and also the use of mild antiseptics.

THIRD,—in herds in which the infection is manifested, not only by disturbance in the calves and by metritis and retained placenta in cows, but also by abortion, where a small percentage of the herd aborts, or instances in which a large percentage of the herd is so involved, and in which some sterility also exists.

The control measures would consist of segregation of all sterile cows and cows showing a discharge. In these cases I would use a more strict sanitary method, beginning first by cleaning up premises thoroughly (removal of all manure and litter, and disinfection of barns, removal of manure from feed lots, yards and all manure removed to be placed on farm lands, not on pastures). Disinfectant composed of 3 per cent liquor cresolis applied liberally and when used in barns, lime should be incorporated in order that no portion of the barn will be left untreated. While the premises were being cleaned and disinfected, the herd should be given the bacterin treatment, in which not less than six doses of the bacterin should be given each of the breeding animals on the premises, the doses being given about one week apart, except in range animals, where three injections of bacterin are sufficient to control the infection.

The sterile cows should be given a careful examination of the genital organs and any defect or any malposition, cystic ovaries or septic metritis, corrected, such cases usually requiring several examinations and treatments.

Calves affected with pneumonia, white scours or umbilical infection should be given the bacterin treatment, repeating the dose every three to five days, and I would recommend that all calves on such farms be given an immunizing dose within three days after birth.

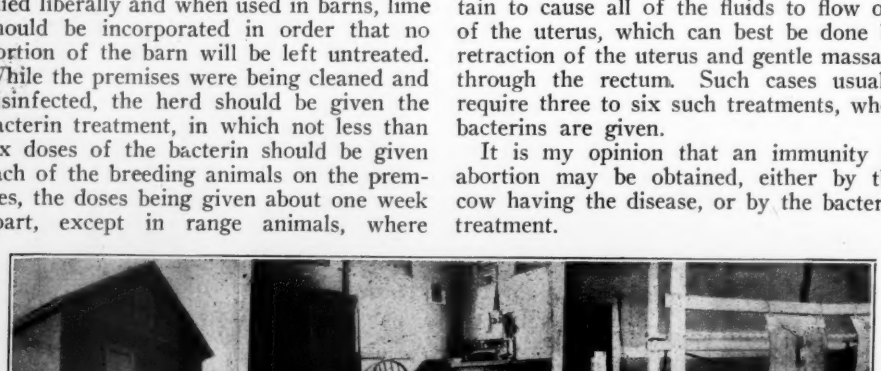
My experience has been that the application of bacterin in such herds overcomes retention of placenta, metritis, scours, pneumonia and umbilical infection in calves and also diminishes to a minimum the loss of calves due to abortion.

In addition the bacterin treatment in dairy herds has been found to overcome the serious losses due to diminished flow of milk, and also it has practically eliminated mammits in dairy herds.

The treatment of herds without the use of bacterin has not been successful in my experience. The administration of drugs will not prevent abortion in cows affected with this disease, particularly those cases in which abortion is imminent.

Treat the cases of purulent metritis by use of a very dilute solution of liquor cresolis as an irrigating fluid, giving injections every three or four days, being certain to cause all of the fluids to flow out of the uterus, which can best be done by retraction of the uterus and gentle massage through the rectum. Such cases usually require three to six such treatments, when bacterins are given.

It is my opinion that an immunity to abortion may be obtained, either by the cow having the disease, or by the bacterin treatment.



Veterinary hospital of Dr. O. Van Brussel, Maryland, Mich., showing front of building and interiors of office and operating room.

AMERICAN JOURNAL of VETERINARY MEDICINE

Published Monthly by
AMERICAN VETERINARY PUBLISHING CO.,
9 So. Clinton St., Chicago

Address all communications to the AMERICAN JOURNAL OF VETERINARY MEDICINE, 9 South Clinton Street, Chicago, U. S. A.

Subscriptions from the United Kingdom should be sent to Messrs. Bailliere Tindal & Cox, No. 8 Henrietta Street, Covent Garden, London, England.

De Vine on Contagious Abortion

A RECENT issue of *The Veterinary News,* London, contains a splendid article on contagious abortion in cattle by Dr. John F. DeVine. The article is in part a reprint of Dr. DeVine's article on retained placenta which appeared in the April, 1918, issue of the American Journal of Veterinary Medicine, and is in reply to an article by J. L. Cormack, M. R. C. V. S., published in *The Veterinary News,* January 11th last.

This article in *The Veterinary News* deals with the subject in the usual practical manner which characterizes Dr. DeVine's writing. The scientific research of American and British veterinarians on the subject of contagious abortion has been most important, and more research of this nature is needed. Yet the fact remains that as yet none of the published articles, by scientific investigators have been of as much value to the practitioner as he could wish. It has remained for Dr. DeVine to incorporate the results of the research workers with his own vast experience in cattle practice and out of the whole to elaborate a plan for handling contagious abortion that is feasible and practicable for the practitioner.

As a result of further study of this subject which is being made by the Bureau of Animal Industry and by a number of state agricultural experiment stations, better methods of combating contagious abortion may be elaborated and a general plan for limiting the spread and possibly ultimately eradicating the disease may finally be worked out. At the present time, however, the practitioner will add to his own reputation and to the pocket-book of his client by following the advice and adhering to the plans that Dr. DeVine has so freely given in these pages during the past year. During the next few months, Dr. DeVine will add much to what he has already published on this subject.

Some parts of the article referred to above seem particularly well worth quoting. They are:

> If an animal is worth more for beef than as a dairy animal, let her be sent to the block. The danger of farmers carrying home virus on their boots in sufficient quantity and virulence to infect their own herds is too far-fetched. But if she is a valuable dairy animal she should not be by any means so sacrificed, when abortion is in reality one of the simplest of the serious contagions among animals that we have to control.
>
> I have but little faith in the value of any test that may be applied to determine whether an animal is infected with the Bang virus. It is useful as a herd test to determine the presence of the infection in the herd, but in the case of an individual, should the reaction be positive, it gives us no definite information as to whether this animal has aborted, will abort, or will not abort. What we want to do is to deal with the case in hand, and protect the pregnant animals from infection, or, if they are already infected, trust to the body resistance to take care of it. By that I mean that the minute an animal shows symptoms of aborting, she should be removed from the herd. We do not need to take her to a St. Helena to make the quarantine effective; any stall, shed, or enclosure, properly sheltered, the floors well limed (burnt lime), will do, even though such a place of confinement is reasonably near by the main farm buildings.
>
> The limed floor and lime at the very threshold where one walks in and out prevents the spreading of the virus on the boots of attendants, and takes care of the litter that is to be sent to the land.

This isolation, if begun before the uterine seal has been penetrated so as to prevent the wholesale contamination of the principle stable, may end reasonably soon after aborting, if the animal receives proper treatment.

One cannot discuss retained placenta without discussing abortion, since retained placenta is simply one of the symptoms that so frequently attend the venereal disease styled abortion, when abortion takes place later than the fifth month.

There seems to be little mention in the literature of the subject of the value of sanitation or the treatment of the aborting animal, and these are the two keys that simplify the control of contagious abortion.

With our want of knowledge of the port of infection, the only vulnerable point in this cycle to attack is the uterus of a cow after she has aborted; this, coupled with sanitation and protecting the other animals, confines the loss occasioned by this malady practically to one season.

When a cow aborts in a herd, or when she goes full term and holds her afterbirth, showing a placentitis and cotolydonitis, it is then impossible to determine how many other animals in that herd may or may not abort. It is, however, I believe, common knowledge that if the herd is well nourished, the middle-aged animals are less liable to abort than are the heifers or the much older cows; and my experience has been that medication or biologics have no value in preventing any of the animals from aborting providing the infection is virulent enough to overcome the normal body resistance; therefore, we should devote all our attention to sanitation; that is, keeping infection from them, and making them physically as strong as possible by good care and proper nourishment.

By sanitation I mean a thorough disinfection of the posterior half of each cow's body each day, so liberally as to saturate the floor and posterior half of the stalls, as the solution drips from the cow, unless extremely cold weather forbids it, when the floor and drop disinfection should be taken care of by lime, and the cow's genitals, tail, and udder still washed irrespective of how cold it may be.

Should any other animal show evidence of abortion, she, too, should be removed and isolated.

If the aborting animals receive the treatment suggested in my article on handling retained placenta (See Amer. Jour. Vet. Med., April, 1918), the period of isolation need not extend at the most over one month, and, further, there will be no occasion for sending such an animal to the block, since, if the uterus receives a careful cleansing with a hot saline solution so as to relieve its pathological condition and prevent extension to the tubes and ovaries, the percentage of animals that fail to conceive promptly and carry their calves to full term will be reduced to a negligible quantity.

I have records of herds where conditions made it possible for my office to give the proper attention to such animals, where abortion ran as high in one herd, one season, as 46 per cent, aborting nearly every heifer in the herd, notwithstanding that every other one (50 per cent) had been treated with vaccine. Conception in this herd the year following was 96 per cent full periods of gestation, with a strong, healthy calf, 100 per cent.

Records of thirty-seven other herds, constituting 111 animals, under this method of handling, sometimes imperfectly applied, subsequent abortions were frequently limited to 2 per cent, and in no herd did they exceed 8 per cent.

This clinical evidence tends to give one cause to attach less significance to the frequent presence of the Bang organism in the udder.

In this connection, we call the particular attention of readers to Dr. DeVine's article on white scours in calves in this issue. Dr. DeVine was the first to point out the danger of contaminated milk as a source of the infection that causes white scours in calves. This important discovery was the result of observation in his own practice. It was pooh-poohed at the time by the research workers. They accept it now.

Keep your eye on Dr. DeVine's department of cattle practice if you would learn the latest and best on abortion disease and other matters arising in cattle practice.

Lieut. Colonel L. A. Merillat, who has written friends that he expects to reach the United States by July 1st.

Post Graduate Courses in the Royal Veterinary Colleges

FOR many years the question of conferring the diploma of membership of the Royal College of Veterinary Surgeons on qualified veterinarians of other countries has been before the R. C. V. S. of Great Britain. There has never been a satisfactory solution as regards the period of study that should be put in at one of the affiliated colleges of the R. C. V. S.

Recently it has been decided to permit four Canadian graduates and fifteen Australian graduates to appear for final examination after an attendance of two terms at a veterinary college in the United Kingdom. All of these veterinarians have served in the British army, and it is because of such service and not as a recognition of veterinary colleges not affiliated with the Royal College of Veterinary Surgeons that this concession has been made.

Major Charles G. Saunders, well known to our readers as former editor of the canine department of the Journal, is one of the four Canadian veterinarians enrolled in the Royal Veterinary College of London. He will appear for examination for an M. R. C. V. S. at the end of December, this year.

In a recent issue of *The Veterinary News*, the desirability of a time credit in the R. C. V. S. for courses completed in foreign veterinary colleges, is discussed and the suggestion made that graduates from colleges maintaining an acceptable four-year course be permitted to take the final examinations for membership in the R. C. V. S. after spending one year in a college in the United Kingdom. Such action if taken would undoubtedly result in an appreciable number of American veterinarians taking a year's work in the British schools. German veterinary schools formerly received students from this source. England has the opportunity to get them now if she wants them.

Army Veterinary Service

From the Office of the Surgeon General

Major Wm. Reid Blair, V. C., was honorably discharged from the Veterinary Corps, May 31, 1919.

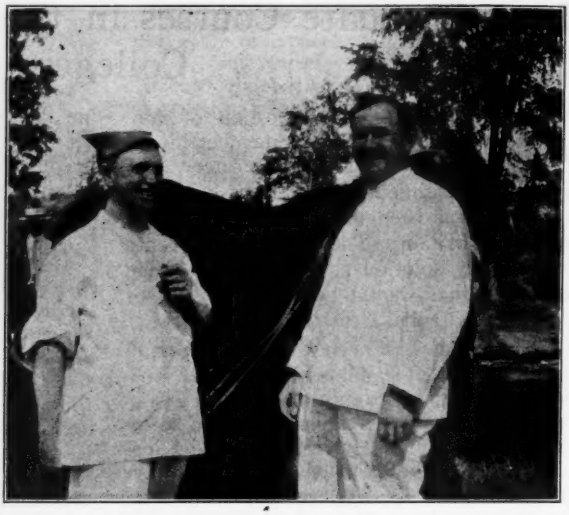
Major Blair was commissioned in the Veterinary Corps on November 28, 1917, ordered to temporary duty in the Surgeon General's office on December 19, 1917, and on December 22 was ordered to Camp Lee, Va., for the purpose of organizing advanced veterinary hospital No. 5 for duty overseas. This hospital was composed of 311 enlisted men and seven officers.

After a period of training at camp Lee and Camp Hill, Major Blair and his organization sailed from Newport News on May 9th, 1918, landing at St. Nazaire, France, the latter part of May, 1918. Immediately after landing, his hospital was assigned to duty at auxiliary remount depot No. 1, Base Section No. 1, at St. Nazaire. Finding no adequate facilities here for quarantine and hospital treatment of the large number of animals suffering from strangles, influenza, pneumonia, etc., a series of barracks occupied by French colonial troops were obtained from the French authorities, and after these were vacated the barracks were converted into a model hospital. This hospital was located about three-fourths of a mile from the remount station, so that all contagious or infectious diseases were removed from the remount depot. After the hospital had been in operation two months, it was visited and inspected by the commander-in-chief of the A. E. F., with a number of his staff. The arrangement of the hospital and the work of the organization were commended by General Pershing.

On August 1, 1918, Major Blair with his organization was ordered to the headquarters of the 3rd Army Corps, with station at Mazy-on-the-Marne, for the purpose of assisting in the evacuation of animals during operations in that vicinity.

On August 22, Major Blair with hospital No. 5 was ordered to the headquarters of the 4th Army Corps located at Toul. Here, he was assigned as corps veterinarian of the 4th Army Corps, and the command of veterinary hospital No. 5 taken by Major Nelson.

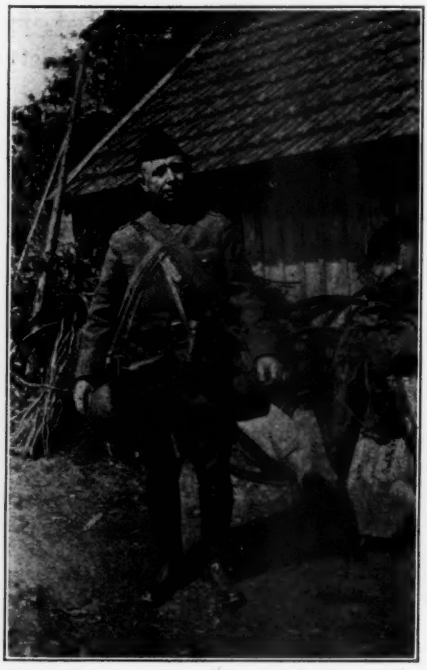
Dr. John H. Blattenberg as he looked when he located for practice at Lima, Ohio, 25 years ago. He intended to become the best known practitioner in the state and he did.



Because of his skill as a surgeon, Dr. Blattenberg is in much demand at veterinary clinics. Here he is with Dr. W. R. Fowler of Toronto at a clinic of the Michigan Veterinary Medical Association, Rochester, July 1914.

Dr. John H. Blattenberg as he looks today. One of Lima's well-to-do, substantial and influential citizens. No, he is not married; the depilation is due to the hardships of veterinary practice and the wear and tear of social life in Lima.

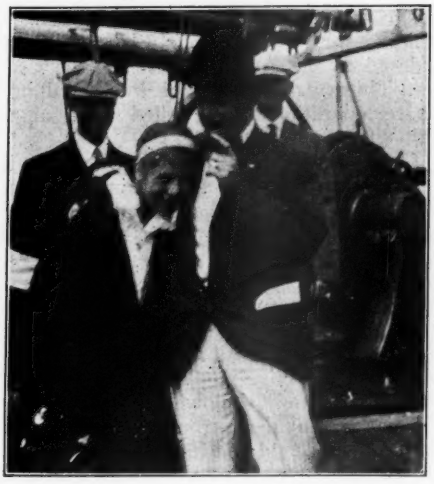
Major Blattenberg killed horses as well as Germans. This one had glanders and was a menace to its fellows.



Major John H. Blattenberg in France, marching to the front in battle formation.

Still going forward; additions to his equipment necessitated some means of transportation. He commandeered what was to be had.

His billet. Whether his tent was pitched in the chaparral plains of Texas or whether he slept in a shell-torn village in France, Major Blattenberg took things as they came and continually brought recruits into the ranks of the Ancient and Respected Order of Blue Owls of which he is the founder.



Returning from Europe on the good ship St. Paul. Dr. Blattenberg insists that he will have a bride at the N. O. meeting of the A. V. M. A. but confesses he has not yet definitely decided upon the particular lady who is to be the bride. His friends do not believe he will be able to make this decision.

In his capacity as corps veterinarian, Major Blair organized the veterinary service preparatory to the 4th Corps' participation in the St. Mihiel drive during September 12th to 14th. The veterinary service of the evacuation of animals during this drive received the commendation of the corps commander, General Dickman.

On Major Blair's recommendation, a number of concrete dipping vats for the prevention and treatment of mange were established throughout divisional areas so that animals could be treated without evacuating them to the hospitals in the rear. This method of treatment was highly successful and met with the hearty approval of the organization commanders who were universally opposed to the complete evacuation on account of no replacements being available during this period.

After the armistice, Major Blair accompanied the headquarters of the 4th Army Corps when it became a part of the army of occupation in Germany, finally locating at Cochem, Germany, where he remained until relieved by Major English and ordered to the U. S. Major Blair reached the U. S. on May 22nd on the S. S. "Imperator." Upon his arrival in the U. S. he was ordered to the office of the Surgeon General for report and was discharged May 31st, 1919.

Major Blair expressed himself as having enjoyed the army and as having received the very best kind of co-operation during his service in the A. E. F. Having commanded both veterinary hospitals and the veterinary services of corps troops, it enabled him to gain a very wide and valuable experience, and his views on reorganization and the needs of a properly organized veterinary service have been greatly appreciated.

Major Albert M. Towner, V. C., U. S. A., was honorably discharged from the Veterinary Corps, U. S. Army, on May 31, 1919.

He was commissioned captain, V. C., N. A., November 22, 1917; reported for duty with the 27th Division at Spartanburg, S. C., December 29, 1917, and assigned to the 54th Infantry as brigade veterinarian. On January 24, 1918, he was made division veterinarian, 27th Division, when he organized the divisional veterinary service.

Captain Towner sailed with the division

from the United States, May 18, 1918, and arrived in France on May 30th. Upon arrival in France, the division proceeded into Belgium, where it served with the British forces in that sector. While there, the division took part in the Ypres-Lys offensive. It stayed in Belgium until the first week in September, when it proceeded to the sector between Cambrai and St. Quentin, where it took part in the Somme offensive, crossing the Hindenburg line at Bellicourt, September 29, 1918.

Captain Towner was promoted to the grade of major on August 23, 1918, while he was division veterinarian, 27th Division. On October 19, 1918, Major Towner was transferred to the 3rd Army Corps as corps veterinarian and remained with this corps until February 1, 1919, when he was transferred to the American embarkation center, Le Mans Area, as chief veterinarian. On April 23 he was relieved from duty at the embarkation center and ordered to the United States for discharge, leaving Brest on May 15 and arriving in the United States, May 28th.

Upon arrival in the United States, Major Towner was ordered to the Surgeon General's office for consultation with the veterinary division. He offered some very valuable suggestions regarding the veterinary service, based upon his war experiences.

Major Towner has applied for a commission in the Veterinary Section, Officers' Reserve Corps, and is very optimistic for the future of the veterinary service.

The famous French General Marechal Petain decorating Major G. R. Powell, Assistant Chief Veterinarian, A. E. F., with the Legion d'Honneur. Major Powell is from Cleveland, Ohio, and is the first veterinary officer to be decorated with the Legion of Honor and the only veterinary officer decorated by M. Petain.

Major Charles E. Clayton, V. C., U. S. A., was honorably discharged from the Veterinary Corps, U. S. Army, on June 4th, 1919.

Major Clayton was commissioned in the Veterinary Corps, National Army, November 28, 1917, reporting at Washington, D. C., December 27, 1917, and assigned to the 3rd Division, Camp Greene, N. C., as division veterinarian, January 14, 1918.

Division headquarters sailed from Hoboken, N. J., for overseas service March 31, 1918, and arrived at Bordeaux, France, April 5th. The division immediately proceeded to Chautevillain Training Area, where it underwent a period of intensive training until May 31, 1918, when it was ordered to the Advance Zone in the Chateau-Thierry district where it entered into active operations that lasted until about July 28, 1918.

On June 28, 1918, Major Clayton was relieved as division veterinarian, 3rd Division, and ordered to the S. O. S. as veterinary inspector of veterinary hospitals and remounts with station at Tours. On August 25, 1918, he was made corps veterinarian, 5th Army Corps, stationed at Ben-Noit-Vaux, where preparations were being made for the St. Mihiel drive. The division took an active part in this drive which was immediately followed by the Meuse-Argonne campaign, from September 25th to November 11, 1918. The 5th Army Corps was ordered to the training area at Nogent-en-Bassigny on November 22, 1918, and when orders were issued for the disbandment of this corps and return to

(*Continued on page* 381)

DEPARTMENT OF

BOVINE PRACTICE

Edited by JOHN FRANCIS DE VINE, D. V. S.

White Scours or Infectious Diarrhea in Calves

I should like some information to help me get rid of scours in a herd of registered Jerseys that I have been treating for some time. The calves are carried full time and when dropped are as strong, rugged calves as any but within ten or twelve hours they develop scours and within twenty-four to thirty-six they die.

I have injected them with all proportions of serum from ten to thirty c. c. as soon as they were dropped and have repeated in ten hours but still they died. Then I gave them the same injection and a small tablet of sulpho-carbolates. That was no better. Then I gave the serum and tablet and a mixture containing a small amount of opium but with the same result. I have ligated the cord as soon as dropped and painted with iodin or when I could not get there for an hour the owner has done it. The serum has been injected the same way. There has been no waiting a number of hours before treatment began. The stable, a new barn, has been disinfected and a platform made so the cows are not moved to the usual stall to calve as I thought the calves might have gotten infected there. The calves are put in a new stall where there never was a cow but they are just as bad. Last week two calves were born the same day and I was there when they came and both were injected with thirty c.c. of Mulford serum. In eight hours one started to scour and was given thirty c.c. more and the other twenty c.c. Within fourteen hours the first was dead and the other scouring. The owner gave this one some patented medicine and it is still alive although he gave several doses.

This herd has never had contagious abortion and it is very seldom that a cow slinks her calf. Out of forty-two animals bred or ready to breed in a year, there has been only two abortions and of those the cause was of a different nature.

If there is any medicine or anything else that I can do I should be very glad to get the help as the owner is disgusted with the results from serum as we have used a considerable amount.

F. G. R.

Being in a dairy district I have for years been forced to take an acute interest in this problem. At the time I took up the practice of veterinary medicine, the writers on this subject in dealing with the channel of infection were either silent or quoted the conclusions of Nocard, that white scours in calves was transmitted chiefly, if not solely, through the umbilical wound. After a few years in practice my observatons led me to doubt this theory. In the year 1903 I saw more of this trouble in my community than I have seen in all the years that have followed. It seemed as if every client owning a dairy appealed to me for relief from this destroyer. After instituting every known form of strict sanitation so as to protect the umbilical cord from external infection, the trouble still continued. In addition to sanitation of the stalls I decided to eliminate positively external umbilical infection in some herds near my office, by either being present myself or having a reliable assistant present, at the time of parturition. I had the fetus caught in a clean sheet and the umbilical cord tied with a sterile ligature, reaching into the genital canal to do so in some cases so as to ligate before cutting or breaking the cord; this failing I then decided the digestive tract was the point to protect, and the results obtained which we shall discuss under "Control and Treatment," have proved conclusively to me that while umbilical infection may be one source of transmission and the swallowing of the amniotic fluid may be another, the overwhelming majority of cases are due to infection through the digestive tract, and that after the calf has been dropped, and *not in utero.*

We note that others now look upon oral

infection as a prominent source of transmission. Williams who has made extensive observations upon the method of infection of the calf, believes that white scours and abortion are allied ailments, and also believes that intra-uterine infection is a common source of both white scours and contagious abortion, not through the placenta but through the chorion from the utero-chorionic space; believing that the uterine seal is frequently broken down in the cases where abortion infection is severe, the infection being both through the allantoic and the amniotic fluid, the latter being the most frequent by the fetus swallowing the infected fluid; and in the case of abortion, heifers may be born infected, or become so immediately after birth and continue to be infected until they mature and abort. The latter conclusion, I believe, is based on the fact that such calves' blood react to the serologic tests. Let me explain that I have always admired William's thoroughness in doing things and his courage to speak or write as he thinks, but we sometimes reason differently from our friends.

Some very reliable workers question very positively that there is any common alliance between abortion and white scours, but that they are two distinct etiological entities. Schroeder is one of our authorities who holds this view and in a communication from him he gives me the following data of experimental evidence gathered at the federal experiment station at Bethesda, Md.

"At the station we have had much abortion disease and many abortions, but we have not had a single case of white scours, notwithstanding that we have had many calves of healthy cows under observation which were given abortion infected foster mothers, and many calves of abortion infected cows which were given healthy foster mothers."

While it is a fact that in some herds in which abortion disease is raging, we often have many cases of udder infection and not infrequently in such herds many of the calves that are carried to or near the end of a normal gestation period, develop a highly virulent form of white scours, it is likewise true that we may and do have in herds severe abortion without the slightest evidence of white scours. Conversely we may have infectious scours with no prominent evidence of abortion disease. Clinical experience leads me to lay but little stress on uterine infecton in the case of either abortion disease or white scours. As to the first disease I would like to ask even if the calf be actively infected at the time of birth and the presence and viability of the Bang organism demonstrated, would it not be possible for active infection to die out and the calf's blood still contain an amboceptor?

I could give voluminous data of heifers aborting, the offspring of dams that never aborted and conversely of heifers from aborting dams that never aborted when either removed from the infected herd or when kept in the same herd after strict sanitation had been carried out.

I yield to no man in my respect for laboratory attainments, but where careful intelligent observation and practice differ from laboratory theories, I am strong for clinical observations.

In the case of white scours if we accept the theory of extensive intra-uterine infection, how could we hope to obtain results by sanitary intervention either before or after the birth of the calf, such as we will show has been obtained, in discussing the control of white scours?

It is quite probable that those who believe that intra-uterine infection is a common method of infection in white scours have based their opinion on the belief that the B. coli and certain cocci are the etiological factors and that because these are frequently found in the meconium, the fetal fluids and the utero-chorionic space, this in itself is reasonable evidence of this method of infection. This, of course, is in no way conclusive proof since the etiological factor has not been positively and universally acknowledged to be the colon bacillus or some of its varieties, and then again these organisms have been found in the fetal fluids and the utero-chorionic space in the sealed uteri of apparently normal cows.

Symptoms

White scours or infectious diarrhea in calves is an acute infectious disease of the newly born calf. The symptoms, which may appear from a few hours to many days after birth, are manifested by a persistent white and frothy diarrhea and loss of strength, the mortality ranging from 50 to 90 per cent. Death may occur dur-

ing the first twenty-four hours, or the disease may run a course of several days or weeks, terminating either in recovery or death, with pulmonary lesions. Calves that succumb the first day are usually those that are weak and undeveloped.

With stronger calves frequently the first indications are that the calf ceases to feed, stands in one place with its back arched, and a staring look; or it may be very much depressed and lie down a great deal of the time. Diarrhea ordinarily appears early as a symptom; the material is very fluid, at first yellowish, later grayish white in color; frequently frothy containing lumps of clotted milk and not infrequently blood streaks. The odor is described as being peculiarly sweetish and putrid. The parts around the anus are soiled and the hair matted. The calf loses flesh rapidly, the flanks are hollow, eyes sunken, hair dull, often lying listlessly with occasionally grating of the teeth, the nose is hot and dry, the temperature elevated. As the disease progresses the body may become cold and clammy and the temperature subnormal. In some animals violent straining hurries on rapid exhaustion. In severe cases exhaustion is sometimes so complete as to border on coma for a time preceding death. In some cases the animal bloats considerably causing pain and uneasiness by pressure on the abdominal walls. In cases where the infection is apparently milder or the calf more resistant and the disease is manifest in a more chronic form, articular or pneumonic symptoms may be pronounced.

Control

Finding that all efforts directed at the prevention of umbilical infection failed, I accordingly had maternity stalls prepared by thorough disinfection, the floors limed and newly bedded. All cows that had the appearance of calving within a week or ten days were thoroughly scrubbed with a disinfectant and covered with a blanket, if the weather was cold enough to warrant it, and transferred to the maternity stalls or to the section of the barn prepared for them. The cows were taken daily from these stalls and their vaginas douched with a mild solution (1-1000) of permanganate of potash. The udders and hindquarters were thoroughly scrubbed with soap and water, and this treatment was continued until the cow freshened.

As soon as she freshened the first milk was drawn with the hope of removing the infected milk lying in the wells before the calf was allowed to nurse. There is no danger of removing all colostrum by such milking since this substance is present in the udder of the new milch cow for several days. The calf was then allowed to nurse and when finished was separated from the dam either by a movable partition or by tying in one end of the stall and allowed to nurse again only after the dam had been properly prepared. This was repeated several times daily for a few days. After that the calf was fed only twice a day and then from a pail. If any evidence of scours existed, the calf was fasted for twelve hours and given a dose of castor oil to which had been added the proper dose of an intestinal antiseptic such as creolin or formalin; and then allowed only boiled milk, lime water and a pinch of ground flaxseed, instead of the whole raw milk.

This method solved the problem so thoroughly that calf scours has become one of the minor evils of the dairy problems in my community.

Biologic Treatment

There seems to be plenty of evidence from reliable sources that the administration of anti-white scours serum to the new born calf is of great value in controlling or mitigating outbreaks of white scours; still I have had, and I know of others having had outbreaks of white scours where serum gave no apparent relief irrespective of the time it was used or the quantity used. This, however, is no proof that there are not endemic or indiviual cases where it might act as a specific and I would advise its administration in all outbreaks, but in the face of the evidence gathered from my personal experiences I would not dare trust to it alone in the case of valuable animals, but would precede and couple it with the *sanitary handling* here described.

According to our present knowledge treating the pregnant cow with bacterins can have absolutely no value since reliable investigation seems to have conclusively shown that hemolytic antibodies are not transmitted through the placenta to the fetus in utero.

Queries and Answers

Cerebrospinal Meningitis in Horses

I would consider it a favor if you would give me any information on the subject of cerebrospinal meningitis in horses. On May 15, 1918, I was called to see a two-year-old colt down with the above disease. He died two hours after I got there. During the next twenty-four hours, six animals took this disease. Four of them died with it in from twelve to thirty-six hours, first losing the power of deglutition. The other two we managed to pull through. During this outbreak I called in another veterinarian, and he advised bleeding them. So we bled the affected animals, and I kept up my treatment of strychnin hypodermically in one-half grain doses, together with mixed infection bacterins once daily. There were fourteen horses in this barn, and none of the others were affected. They were getting the best of well water and good oats, but rather poor upland prairie hay.

On May 29, 1918, I was called to a farm two and one-half miles west of the former outbreak and found five horses affected, three down; and altogether within the next week, nine horses died within twelve to twenty-four hours of showing loss of deglutition. In this outbreak we bled all the affected animals and also used the treatment I advised in the other cases, as I have treated this disease before with strychnin and bacterins and had good success. We also applied mustard constantly to the throat, poll and spinal column.

On September 4, 1918, I was called to a farm seven miles north of the former outbreak and found two horses with well marked cases of cerebrospinal meningitis. Four animals out of six were affected and two died, the first two which were affected. I did not perform phlebotomy in this outbreak, and one of the patients, a pony mare six years old, showed as bad a case as any I had, but I continued to give her the former treatment and she recovered nicely.

I had been trying to get further information from authorities in this province, but nobody could suggest any more satisfactory treatment than my own. The horses in this last outbreak were taken to the farm of the second outbreak to work in the harvest and were fed oats such as had been fed to the horses affected in that outbreak and developed the disease two days afterwards. These oats were sent to two different places to be analyzed, but were pronounced free from poison of any kind. The water and hay were of the best in both these latter outbreaks. I called in a government veterinarian, and on post morten examination, we found at the base of the brain a small quantity of pus, and the membrane showed distinct signs of inflammatory action.

I am afraid this is a very long-winded report, but it is not half as long as it might be if I could go into all the details. However, I have given the main, important facts, and as this is such a serious question to me and there will probably be more cases this spring, I hope you will be able to give me some help in this matter. This was certainly a bad form of cerebrospinal meningitis and the hardest proposition I was ever up against. Also I did not seem to get much satisfactory support from our provincial veterinary department as I think it was the first outbreak of that nature they had seen. Of course, I observed the most strict sanitary and quarantine precautions in every case. None of the animals from the first outbreak went near the farm where the second outbreak was.

Would you recommend arecolin hypodermically to get free bowel action after patients are unable to swallow, or would it be too stimulating to the diseased nerve centers? I did not try it. N. J. H.

REPLY BY DR. E. L. QUITMAN: This is forage poisoning (infection) without a doubt. Bleeding is of no value except to relieve delirium when the disease assumes that form, and one-fifth grain doses of lobelin sulphate will do the work very nicely. This may be repeated every twenty to thirty minutes to effect. Strychnin is of no value and is usually contra-indicated.

No line of treatment has given as good results as might be desired. The best results have been attained by the following:

The prompt administration of an active dose of arecolin hydrobromid with lobelin sulphate (one-fifth grain) or physostigmin sulphate in one to one and one-half grain doses. The latter is preferred and may be purchased in sealed tubes. Then, if it can be administered, a full saline purgative, and the following:

Hexamethylenamin, one dram every four hours or two drams three times a day in capsule or water solution, alternated with—

℞

Potassii permanganas ..... ʒj
Alumini sulphas ..... ʒj to ij

every four to eight hours in one to two pints of water or capsule (best in water).

FETID NASAL DISCHARGE IN A MARE

I am writing you about a case I have been treating and am not having very good results. About three months ago I trephined a mare for one-sided nasal discharge and have had the owner wash and syringe the superior maxillary sinus once or twice a day ever since, but now the opening has closed and the discharge is getting worse. I trephined this mare again a few days ago in the upper compartment of the superior maxillary sinus but did not find any pus or any odor.

In the beginning of the trouble, there was a good deal of odor but while treating it, this nearly all left. Since the opening has closed, the odor has returned. I have examined the molars and cannot find anything wrong. The discharge is mostly thin, but at times somewhat lumpy. There has never been any bloody discharge nor ulcers in the nose. I have used a solution of potassium permanganate, also some polybacterins on this case. When I first trephined the lower compartment of the superior maxillary sinus, I found quite a lot of pus.

G. T. S.

REPLY BY DR. E. L. QUITMAN: I am strongly of the opinion that there exists a diseased molar which should be extracted. Put her on the following prescription, which is adjusted for an adult equine weighing about 1,300 or 1,350 pounds.

℞

Arsen. triox.	℥jss
Cupri sulph.	℥iv
Fenugreek	℥j

M. et div. in pulv. No. XXX

Sig: one powder in the feed t. i. d.

After five or six days, the nasal discharge may be more profuse. This is a good sign. Continue the treatment four to eight weeks if necessary. Continue at least ten days after the discharge stops.

RECURRENCE OF NASAL DISCHARGE

I had a bay mare weighing 1,500 pounds brought to me last October, having a fetid discharge from one nostril which interfered considerably with her breathing. After having her tested for glanders, to be on the safe side, and getting no reactions from the test, I proceeded to operate by trephining just at the junction of the lachrymal and superior maxillary bones and found a large mass of caseous matter, which I removed and thoroughly flushed out the cavity with hydrogen peroxid followed by a solution of iodin. This treatment was kept up, together with the use of mixed infection vaccine (Parke Davis) until the wound had healed, and in four weeks the discharge had completely stopped. The owner brought the mare back to me recently and I found the discharge had commenced again. It has no bad odor but it is of a thick creamy nature. As the mare is heavy in foal, I do not wish to operate again at present, so I should appreciate advice as to any line of treatment to avoid operating. The mare is in really good shape and has gained in flesh all the time.

N. J. H.

REPLY: See answer by Dr. E. L. Quitman to the preceding query.

ASCARIS MEGALOCEPHALA FOUND IN THE STOMACH

In using the stomach tube on a mare with acute indigestion, I washed out three worms that resembled the Ascaris megalocephala. Why should they be found in the stomach?

H. B. F.

REPLY: The Ascaris megalocephala or equorum is common in the small intestine of the horse, ass and mule, and there may have been an abnormal peristalsis in this case, (reverse or antiperistalsis is of common occurrence in acute indigestion) which carried the worms to the stomach.

ABORTION IN SOWS IN IOWA

One of my clients recently reported that he has a herd of sows several of which had aborted.

The sows had recently fed upon the carcass of a horse, but one abortion had occurred previous to that time, the others did not occur until about three weeks after the animals had fed upon the carcass. Only two sows still carried their fetuses at the time of my interview with the owner.

The evidence would seem to indicate infectious abortion. I would like some information relative to the results of investigations of such cases. Has any bacterin treatment been recommended? Should the client be advised to retain these sows in the breeding herd with reasonable hope of there being no future abortions? Is it considered that abortion in sows of an infectious nature runs the same chronic and persistent course as in the bovine or is an apparent recovery from abortion an actual recovery from the affection?—G. A. H., Iowa.

REPLY: Contagious abortion in sows is coming to be reported with considerable frequency, particularly in Southern Illinois; however, almost nothing is known concerning its nature. It appears to be nowhere near so serious as contagious abortion in cattle.

It is the part of prudence to remove all aborting animals from the herd, and adopt the best sanitary measures practicable.

I have not seen any reports of the use of biologics or medicinal treatment for this ailment.

PARASITES INDICATED

I would like some advice relative to the treatment of a Persian cat which is troubled with vomiting of a frothy substance and looseness of the bowels. The appetite seems good. Vomiting is more severe after eating, and fatty foods do not agree with him at all. A few weeks ago I noticed some small white worms in the vomitus. I fasted the animal for twenty-four hours and then gave one grain of calomel and one grain of santonin, but without apparent relief. The cat weighed twelve pounds but is becoming quite emaciated. As the owner values the animal highly, I would be glad of any suggestions as to treatment.—J. B. L., Iowa.

REPLY: The symptoms you describe suggest worms, and I believe your anthelmintic treatment should be continued for three or four days, and perhaps a dose of male shield-fern for tapeworm should also be given, and then after feeding the animal up a little, the whole treatment repeated.

I should not give cathartics, except a single dose just before the treatment is begun. I should give one grain of santonin every morning for about five mornings.

As an alternative to this, you might try dietary measures with benefit, probably a regimen restricted to raw hamburger steak for a couple of weeks.

HEMORRHAGIC SEPTICEMIA, FORAGE POISONING OR RABIES

Can you give me any suggestion as to the probable cause, course and treatment of the following as I have lost two cases recently and anything I do seems to be of no benefit.

No. 1. Cow, six years old, in good condition. Feed, grain and hay. Found running in a circle, always to left and wandering aimlessly; when tied would flex neck to extreme left and if tied close, stand thus till exhausted. Treated with arecolin, pilocarpin, lobelin and oils, always a staring look from eyes. Got action from drugs used as purge, temperature slightly elevated, pulse accelerated somewhat, animal died on the fifth day.

Autopsy. No marked lesions except an extreme dryness of contents of omasum.

No. 2. Two-year- old steer. Feed, silage, corn, oats, clover hay. Found running in circles, ran all of one night. I was called in the morning, had him caught and tied. Pulse accelerated very much. Temperature somewhat high, administered oil, chloral and lobelin. Called next day, found animal slightly better. gave lobelin 1-5 grain, arecolin ½, pilocarpin 1 grain. Left bovine compound to be given every four hours. Called the next day, animal would drink and eat a little but if made to arise would again begin to go in circles. Advised large doses of sodium chlorid, also gave nux, soda, gentian and ginger, but to no avail. Did not get to autopsy this one. Would potassium iodid do any good or what would you advise. R. H., Ind.

Comment: It would aid in diagnosis to know if either of these animals had been through a public stockyards recently or if they had associated with animals that had been in any public stockyards.

ANNUAL LOSS OF DAY-OLD FOALS

We have a disease among colts that affect them a few hours after birth, usually in the females, and seems to affect the offspring of certain mares each year. The first symptoms are colicky pains, accelerated pulse, labored respiration. The animal seems to be in great pain. There is slight elevation of temperature and the urine is highly colored. There is no retention of the meconium; the bowels are in fair condition. They usually die in a few hours. I have tried various treatments but none have been successful.

There are a number of foals that die from this trouble every spring and if I could do something for it my reputation for all time to come would be made.

N. M. G.—Tennessee.

REPLY: It is probable that this affection of the foals is in some way related to contagious abortion in the mares. Contagious abortion in mares has been reported a number of times from your state. The onset of the disease occurs so soon after birth as to strongly indicate an antepartum source. The course is so swift that no treatment given the foal is likely to prove efficacious. The best chance of saving these foals would appear to lie in improving the sanitary conditions under which the mares are kept and perhaps in the administration of antiabortion bacterins to the mares six weeks to two months before foaling time.

ATROPHY OF MUSCLES FOLLOWING AZOTURIA

A sorrel mare, aged about seven years. went down with azoturia in February, 1919, and was down for several days. She finally got up and has been able to get up all along since, but she is very much humped up in the back, the muscles in the region of the femur being more or less atrophied. The mare gets around very well, eats heartily and seems in good spirits. What would be the line of treatment in such a case? I have seen something like this case before in past years from azoturia but never got anywhere treating them.

REPLY: Atrophy of the recti muscles is a common sequel to azoturia. Where marked atrophy occurs recovery does not take place in less than three months' time and is never delayed more than eighteen months. Recovery is always spontaneous; the progress of recovery is unaffected by treatment. Irritant applications

and irritant injections are wholly useless and represent just so much cruelty to the animal. Your mare should be turned out, allowed to move about at will and have good feed, for it is hard to keep such subjects in condition. A favorable outcome between three and eighteen months following the attack may be confidently predicted. If the owner must be doing something, massage following the application of a bland oil should be prescribed.

LEUKEMIA OR JOHNE'S DISEASE?

I was recently called to see a registered Holstein cow, with a history of emaciating rapidly about two weeks after calving; her milk flow had stopped, and there was no appetite. During the course of a month's treatment, everything known to me in the way of tonics and stimulants was administered, but the cow continued to become more and more emaciated, finally getting so thin and weak that she could hardly walk The lymphatic glands under the neck and on the flanks were enlarged and there was some cough. Tuberculosis was suspected, the cow was killed, and on postmortem examination, numerous white patches varying in size were found on the

Leukemia in a dog. Note enlarged lymphatics.

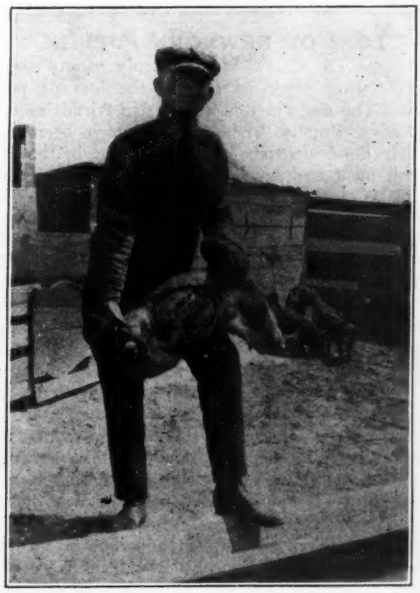
lungs, and intestines while the gall bladder was greatly distended. The absence of nodules or a gritty sensation under the knife, caused me to change my diagnosis of tuberculosis to one of "I don't know what."

In about a month thereafter, another cow in the same herd calved and exhibited the same line of symptoms as the first. The owner fearing that the outcome would be the same. shipped the cow to Chicago. I was told later that she passed the federal inspection without any tuberculous lesions being found. The rest of the animals on the farm were tested and showed no reactors. What was the disease?

Gibson City, Ill. JAMES N. HORN.

INFECTION FOLLOWING SERUM TREATMENT

I recently administered anti-hog cholera serum and virus to a herd of fourteen hogs, about ten weeks old, and ten days afterwards nine of them developed infection at the point where injection was made, considerable areas of tissue becoming necrotic and sloughing off as will be seen by the illustration. I observed proper antiseptic precautions and cannot account for the appearance of this infection. It



did not affect the general health of the hogs as they continued with normal appetite, and the sores are responding nicely to local applications of iodin. What I want to know is, what was the cause of this condition?

M. D. H.

Comment: It would be interesting to know whether the nine hogs that developed infection were the last vaccinated. The fact that five were unaffected would seem to clear the serum and incriminate the operator.

A BRUISE THAT REFUSES TO HEAL

A mare was kicked on the left hind leg by other horses and developed a bruise that refused to heal. It discharged for a while, then closed and became hard and calloused. I opened it and treated with antiseptic solutions, but it did not respond to treatment. It does not reduce in size and the owner says there is more of a

discharge now than at first. What should be done? J. E. H.

REPLY: There is probably a foreign body in this wound, likely a sequestrum of bone, which must be removed before it will heal.

CHOLERA IN YOUNG PIGS

I have been called to treat young pigs, six to nine weeks old. They lie around appearing to be asleep, refuse to eat and drink. They gradually waste away and die. On post mortem examination, I found black feces in the bowels and the liver looked like it had small uclers on it. What is the disease? J. E. H.

REPLY: Hog cholera.

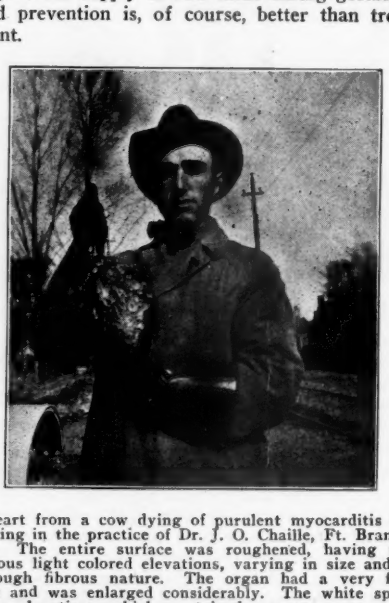
LOSS OF NEWBORN PUPPIES

I note Dr. C. A. White's reply to my query in the June issue relative to the loss of puppies. The dogs in this kennel are Airedales and Cockers. Puppies of both breeds have been lost. Their food consists of soup made by boiling fresh meat and bones with vegetables, rice, etc. This is served by pouring over dog biscuits. Bitches in whelp have raw meat as well as oatmeal and milk in addition to the regular diet. On this diet, I cannot believe the trouble is due to improper feeding as suggested by Dr. White. The owner is now convinced that the dog biscuits are at fault as he thinks the meat in them has been chemically treated. I am inclined to think the trouble due to some toxic substance in the bitches' milk, probably resulting from absorption of toxic material from the intestinal tract. Since sending the query, I have had opportunity to observe the birth of a litter from one of the Airedale bitches. This bitch was brought to me one week before she was due to have puppies. Acting on my theory, I administered mineral oil and sulphocarbolates of calcium, sodium and zinc until the feces were normal. The diet consisted of table scraps, bones, raw meat, dog biscuits, cereal and milk. Eight puppies were born between 10 p. m., April 19th, and 5 a. m., April 20th. Because the bitch had considerable difficulty in giving birth to her previous litter, I remained with her and consequently had opportunity to observe that three of the puppies were immediately disowned by the bitch, who as soon as they were born nosed them into the corner of her box and gave them no further attention. These pups were alive and apparently normal, but attempts to start respiration failed. Of the five remaining puppies, "the runt" was found dead on the morning of the 22nd, and another puppy was found dead on the morning of the 24th. These puppies were nursing and seemed all right the day before. The three remaining thrived and are strong, vigorous puppies. Whether my treatment helped, I do not know, but this litter exceeds all litters recently born by three, the other litters all dying. I am going to repeat my treatment on the next pregnant bitch, starting two or three weeks before the pups are due. On the abdomens of some of these puppies as well as on some of the previous litters, I noticed pustules closely resembling those seen in distemper. This disease has existed in the kennel although there are no sick dogs there now. Could this have any bearing on the loss of puppies?

South Norwalk, Conn. M. R. P.

REPLY: Any regimen that does not consist of a considerable part of raw meat is not a fit diet for a dog, and raw meat is practically the only diet desirable for a sick dog. They will eat it when they won't touch anything else; they will keep it down when everything else is vomited; they will build up on it when tonics and other food are without avail. Many abnormal conditions of the skin, often harshness of the coat, nervousness and peculiarities that one is simply unable to account for by any examination however thorough, will disappear promptly when the dog is put on a raw meat diet. A well dog with plenty of exercise, can eat almost anything and get away with it, but dogs in unnatural surroundings are more prone to get out of condition if they don't get meat and raw meat at that.

Puppies should be taught to eat it before they are weaned and given it almost ad libitum during the growing period. Goiter in entire litters of puppies is common where the bitches are kept in basements in the city. The puppies will recover if the mother is given iodin while they are suckling, but it can be prevented by giving a generous supply of raw meat during gestation, and prevention is, of course, better than treatment.



Heart from a cow dying of purulent myocarditis occurring in the practice of Dr. J. O. Chaille, Ft. Branch, Ind. The entire surface was roughened, having numerous light colored elevations, varying in size and of a tough fibrous nature. The organ had a very foul odor and was enlarged considerably. The white spots show elevations which contained caseous pus, probably due to tuberculosis.

Department of Live Stock Poisoning

By L. H. PAMMEL, Ph. D., Ames, Iowa
Professor of Botany, Iowa State College

Readers are urged to take advantage of the opportunity offered by Dr. Pammel, for the identification of specimens of supposedly poisonous plants. Two good-sized specimens, carefully packed, should be sent to him direct, with such history as may be available. Simply mention that you are a reader of the AMERICAN JOURNAL OF VETERINARY MEDICINE and no charge will be made for this service.

A Little History on Ergotism

About thirty years ago when I came to Ames I had a conversation with Dr. M. Stalker, then the state veterinarian of Iowa and in charge of the veterinary department of the college, with reference to the oubreak of ergotism in Kansas which had occurred a few years previous. From the conversation I had with Dr. Stalker, I received the impression that the diagnosis was made by Dr. Stalker and he was the first one to properly diagnose the disease. I was also told that the veterinarians assembled in Kansas on their return home were to give the information to their respective dailies in the state, but Dr. Salmon allowed himself to be interviewed and that one of the Chicago papers had a "scoop" on the important news item.

Dr. Faville of Hampton Institute on a recent trip to Iowa, paid me a visit and we talked about his connection with the Kansas outbreak of ergotism. I gave him the information I had received from several sources. I requested him to write for me a short account that history might be set straight. With the kind indulgence of Dr. Campbell and the readers I am having this letter published. Dr. Salmon later published a full and exhaustive account of ergotism in one of the early reports of the Bureau of Animal Industry.

"Confirming our conversation during my recent visit to Ames, I submit the following statement covering the history of the outbreak of ergotism near Neosha Falls, Kansas, in the spring of 1884.

"During that time I was connected with the agricultural college in Colorado as Professor of Veterinary Science and Zoology. The Hon. James Grant an ex-student of Iowa State College was governor of the state.

"At the time of the reported outbreak of foot and mouth disease I was very anxious to visit Kansas to study the disease as no one in this country had a chance to study it. Of course, I supposed when such men as McEchran of Montreal, Trumbower of Illinois, Hopkins of Wyoming and others had pronounced it foot and mouth disease, it was the imported disease.

"About the first of March, President Ingersoll of the Colorado college wrote Governor Grant offering him my services as veterinarian in any investigation he might desire to order.

"At this time the Colorado Cattle Growers' Association held a meeting in Denver and urged the governor to quarantine against any movement of cattle from Kansas into Colorado and requested him to appoint on behalf of the state a committee to investigate the Kansas outbreak. The governor appointed as that committee Mr. J. W. Snyder, Mr. F. P. Ernest and myself.

"Sunday morning, about March 10th, I received a telegram from Governor Grant ordering me to meet the other members of the committee at Boulder, Colorado, to investigate the outbreak of foot and mouth disease in a herd of cattle belonging to a Mr. Maxwell.

"I arrived at Boulder about noon on Sunday and was met by Mr. Ernest and Mr. Snyder and by a Mr. G. W. Rust, who was an associate editor of the Breeders' Gazette and a member of the board of trustees of the agricultural college. Mr. Rust also represented the associated press.

"I made a careful examination of the cattle and decided that the outbreak was a typical one of ergotism and not foot and mouth disease, and that night Mr. Rust put on the wires of the associated press a statement that Professor Faville of the agricultural college of Colorado said that there was no foot and mouth disease in Colorado, but that the trouble was ergotism and due entirely to local conditions.

"That night we started for Kansas and sometime during Monday or Tuesday arrived at Neosha Falls. On my way down from Topeka I met Dr. D. E. Salmon of the Bureau of Animal Industry. This was the first time I had met him. On my arrival at Neosha Falls, one of the first men I met was Professor Stalker of Ames. Professor Stalker cautioned me to be careful. Mr. Ernest, of the committee, laughed at him and said, 'We are here to be careful for him.' Dr. Salmon had to be conservative, and withheld his judgment for some time. The others, with the exception of Stalker, were insistent that it was foot and mouth disease.

"Later in the afternoon of that first day, Messrs. Ernest and Snyder came to me and said 'What is the difference between this and the trouble up at Boulder?' I said, 'Not any.' Mr. Ernest then wired Governor Grant and Mr. Rust 'Faville says the trouble is just like that at Boulder and not foot and mouth disease.'

"I felt that as I had made a positive diagnosis of the same thing two days before, I could not well withhold my judgment when I knew that the conditions in Colorado demanded prompt action. Naturally the statement came out the next day in all the daily papers that Professor Faville of Colorado said it was not foot and mouth disease, it was ergotism. This threw a bomb into the camp of the other veterinarians, but I could not help that. I was sure I was right and it did not seem fair to interfere with the movement of cattle from Kansas into Colorado, which at that time was very heavy.

"I was perfectly sure I was correct in the diagnosis, especially when I had made the same diagnosis of a like condition several days before

"I only write this as I have in order to put you straight as to exactly what occurred at that time. So far as I know I am the only veterinarian living who was on the ground and the occurrences were exactly as I have stated."

Cocklebur Injurious

Dr. F. B. Erwin, of Memphis, Texas, sends some specimens of seedling cockleburs with the following letter: "Under separate cover I am sending some specimens of cockleburs which have killed several cows. Kindly state poison and antidote for same."

I published a note on poisoning from cockleburs in the AMERICAN JOURNAL OF VETERINARY MEDICINE, September, 1918, p. 451. Dr. Mayo says it is poisonous only in the cotyledonary stage, and that the physical condition of the animal is an important matter. "If the animals are thin in flesh and the digestive tract is empty the toxic effects of plants eaten is marked." He recommends the use of permanganate of potash because it breaks down most of the plant poisons. With the permangante he recommends the use of sulphate of aluminum, equal amounts of the permanganate and sulphate of aluminum.

Young cockleburs are said to be poisonous. The hairs of the plants cause itching. The common cocklebur contains the substance xanthostrumarin, one of the glucosides. However, Dr. Bitting was unable to find any of the poisonous substance in the growing plant. It is supposed by some that the injury comes largely from the collection of the hard burs in the intestinal tract.

The plants sent me did not contain any of the burs. I am inclined to think that the young growing plant contains more of the poisonous substance than older plants. As to the particular form of the cocklebur sent I am unable to say. Our common species in the north is *Xanthium* canadense, but there are a half dozen closely allied species.

Trembles In Sheep

In a previous number of this journal I called attention to the work Dr. W. A. Wolf was doing with trembles caused by eating white snakeroot (*Eupatorium ageratoides*). In a recent number of the Journal of Agricultural Research Dr. Wolf and Professor R. S. Curtiss published an interesting article on trembles.* This work entirely contradicts that done by A. C. Crawford and also the conclusion of Moseley of the injuriousness of aluminum phosphate mixed with grain and alfalfa hay. In other words they hold that aluminum phosphate is not the active toxic principle, nor is there any evidence that the trembles in North Carolina is the result of a specific organism ascribed to a disease occurring in Texas in which Jordan and Harris find that the Texas and New Mexico disease was caused by *Bacillus lactimorbi*... Curtiss and Wolf describe the disease as follows:

Sheep in the early stages of the disease are sluggish and lie quiet unless urged to rise. They may refuse to eat, or the appetite may be quite normal. There is generally a very considerable decrease in weight, most of which occurs in the last two or three days preceding death. Respirations are accelerated and somewhat labored. A marked stiffness of the legs and ataxia characterizes the movements in walking. If after a day or two the animal is made to stand for a few minutes or is driven a few yards, muscular spasm, especially in the limbs, is evident. The sheep then stands with hind limbs placed well under the body and all feet spread apart laterally. In this posture the back is bowed, the neck outstretched, and the head lowered. Within a few seconds the quivering spreads over the entire body, increasing its intensity, and becomes a violent, involitional tremor. This is accompanied by slight, intermittent, tetanic contractions of the musculature of the limbs. At this stage of trembling ataxia is very pronounced, and the animal is unable to stand. It drops quickly into the normal resting posture, whereupon the trembling immediately ceases. If the sheep is made to rise after it has lain down for a few moments, a second spasm of trembling ensues, with a repetition of the symptoms as described. Trembling may recur repeatedly every time the animal is made to stand. The quiescent period is shortened, however, after each spasm of trembling and may begin as soon as the animal is placed on its feet.

The summary of their conclusion is as follows:

(1) *Eupatorium ageratoides*, commonly known as white snake-root and locally known in North Carolina as richweed, had previously been

*9:397-404 pl. 22-24, 1917.

claimed by Moseley to cause trembles in animals. This claim has been substantiated by experiments with sheep in which green plants of *E. ageratoides* were fed during the months of June, July, August, September, and October, 1916.

(2) Fifteen cases of trembles in sheep have been developed from feeding *E. ageratoides*. Fourteen of these resulted fatally, and one of them recovered. Death of one of these sheep was probably due in part to an infestation of stomach worms.

(3) Death resulted in from five to twenty-seven days following the beginning of feeding of *E. ageratoides*.

(4) Considerable variation existed in the several ewes, also, with reference to the quantity of weed ingested before trembles appeared.

(5) Indirect evidence against the infectious nature of the disease was secured by failure to communicate trembles from sheep characteristically affected to healthy sheep when they were confined and fed together in a small lot.

(6) Salt and soda in the amounts given along with a ration of grain and *E. ageratoides* were without apparent antidotal effect.

(7) No harmful effect followed the feeding for 69 days of aluminum phosphate mixed with grain and supplemented with alfalfa hay.

Variation in Alkaloidal Content of Belladonna Plants

L. W. Wayne, one of the directors of the H. R. Mulford experimental drug gardens, Glenolden, Pennsylvania, has published a paper calling attention to an interesting line of work for plant breeders to improve the amount of drugs found in drug plants. This investigation consisted in obtaining data on 500 plants in the breeding plot. The variation in the alkaloidal content is shown in the following table.

Alkaloidal Content.	Number of Samples
.0-.09	4
.1-.19	8
.2-.29	26
.3-.39	83
.4-.49	94
.5-.59	65
.6-.69	42
.7-.79	26
.8-.89	25
.9-.99	6
1.0-	6
	385

Interest naturally centered on these plants, and a study of the records showed that every one of them was small at the time of harvest, while practically all the plants which yielded .01 or less were large and vigorous in growth. Furthermore, the six high plants all had light stems, while the plants yielding .1 or less had dark stems. These characters were the only ones found which seemed to give a clue to the chemical constitution of the plants, but they were marked enough to warrant especial attention during the coming season, when a selected second generation will be grown.

Milk Sickness

Professor E. L. Moseley who was the first investigator to take up, in a scientific way the relation of trembles to boneset has contributed an interesting paper on milk sickness and trembles caused by resin of white snakeroot.* He finds that when the resinous extract is taken with food by rabbits they are affected in the same way as when eating white snakeroot. The resin has an effect on the kidneys and produces a general passive congestion of the small intestine and various other organs.

In a former communication Professor Moseley made the statement that the poisonous principle was aluminum phosphate. He now finds he was in error and that the poisonous principle is a resin. He again calls attention to the serious case of poisoning that comes from the weed which is common in the north. In my Manual of Poisonous Plants I quoted Dr. Crawford as disputing the work of Professor Moseley, whose work has now been corroborated by the North Carolina station. Dr. Crawford did not settle the question. It is very likely that others will now undertake investigation. Professor Sackett of the Ricketts laboratory is interested, and anyone having good fresh material should communicate with him.

IS THE HONEY FROM YELLOW JASMINE POISONOUS?

Mr. J. H. Brown of Augusta, Georgia in 1879 made the following statement; that the yellow jasmine (*Gelsemium sempervirens*) was decidedly toxic.[1] The poisoning causes a kind of intoxication to young bees, the abdomen becoming distended and there is a great loss of muscular power. In a recent number of the same journal[2] Mr. T. W. Livingston says: "I saw a very few bees working on the bloom, more bumblebees than honeybees, and saw several colonies affected slightly with the disease peculiar to this time of the year. In some cases the bees do not swell up and in others they do. Some have a trembling motion, and others are stupid and can scarcely move. I have seen the same disease where there was no yellow jasmine that I know of, but much more of it where that plant was plentiful."

The Florida state chemist is said to have found some jesamine pollen and poison in the poisonous honey. There is no question about the *Gelsemium* being poisonous. It is doubtful

*Medical Record *92*:428-429.

[1]American Bee Journal 1879:500.

[2]American Bee Journal *59*:157.

whether the bee disease described is caused by the *Gelsemium* plant. No doubt at times *Gelsemium* honey has produced poisoning in man.

Forage Poisoning

Dr. S. L. Gustafson of Searcy, Arkansas, sends me a specimen of crab grass smut (*Ustilago rabenhorstiana*) and the following letter.

"Dear Sir:—Yesterday I received a call from a client, to come at once and see his cattle as they were dying. Upon arrival, I found that he had lost 14 head within 3 days, but had then moved them into a lot, from the pasture where they had been. I went with the expectations of holding an autopsy but it was not possible, as there had been about 16 hours elapsed since the last one died, and putrefaction was too great to do any work of that kind. There is scarcely any history that I could get, as the owner did not notice any of them sick until they were down and nearly dead. There was no struggle at death, whatever. They had been grazing on a very low swampy pasture that contained what is known in this country as crab grass and over a cane field that had been harvested. There was some second growth cane but very little. In going through this grass I noticed that there was a great deal of smut among it. In fact, there was a great deal of it. It occurred to me that possibly that was the cause of the trouble. Therefore, I am enclosing herewith a sample of the grass with some of the smut intact. I wish that you would investigate this at your most early convenience and let me know the result. I would be glad to have an answer in the American Journal of Veterinary Medicine, but I am very eager to learn the action of this smut, and will, therefore, ask you to kindly send me the result as soon as you can. Realizing you are very busy, I must ask you to extend a special kindness, as it means a great deal to me as well as to my client. I remember that at my home in Iowa, which is in good old Page county, we had some trouble with cornstalk poisoning.

"Thanking you very much for your kindness in this matter, I am,"

The smut on crab grass is common in all parts of the United States where the grass occurs. It is certainly common some years in Iowa. While cattle do not, as a rule, have access to land where this weed occurs, they do so occasionally. It would be interesting to have Dr. Gustafson's suspicions verified. I am not inclined to consider this smut strongly toxic. Undoubtedly all smuts, because of their highly nitrogenous character are injurious when not fed with other substances. I am inclined to think that the poisoning is due to the sorghum in the field. It does not take much of the sorghum to produce fatal poisoning.

If it is not due to the sorghum, there is probably some other toxic plant. In the kind of place described, there is probably a great deal of sneezeweed. I would suggest that the place be looked over and specimens of some of the plants be sent to me.

Loco Weed and Salt Sage

I am in receipt of a letter to Dr. Campbell and three specimens of weeds. The weeds I identify as follows: The very wooly plants are known as loco weed (*Astragaius mollissimus*). The other plant labelled "loco weed" is green and is a much smoother plant. This is also an *Astragalus*. I have not identified the species. The white, or salt sage is *Eurotia lanata* belonging to the same family as greasewood.

The following letter was sent by Dr. C. L. Benoy of Maxwell, New Mexico.

"I have had some experience with sage poisoning both in Colorado and New Mexico. The sage which causes the trouble is of a small variety and known in these sections as salt sage or white sage and grows on light sandy soil. I do not agree with the querist in regard to the young plants being more injurious than the old or mature plants. My experience is the reverse. The most cases of sage poisoning which have come under my observation are in the early winter months when the weed freezes at night and thaws during the day. The symptoms are cerebral disorders, convulsions and partial paralysis, urine very dark colored and has a strong sage odor, bowels normal, pulse fast and rather weak, temperature normal, horse in recumbent position generally on left side, impossible to raise the head without assistance, when on foot walk in circles until they fall. Ninety per cent of these cases have been saved with purgatives and bitter tonics. I find the most danger is from the injury they do themselves when down and when confined in box stalls. The majority of the cases are very nervous and when they are confined they simply "blow up." All horses I have handled have been unbroken and perhaps a little more nervous than the work stock in other localities. The sage mentioned by Professor L. H. Pammel as found in the crops of sagehens is a different sage from our salt sage and is commonly called buck or black sage. It is also the home of the wood tick, suspected of causing spotted fever in Wyoming. I am mailing specimen of salt sage under separate cover."

I need say nothing in regard to the woolly loco which is universally regarded as poisonous and injurious by stockmen, veterinarians and scientists. Poisoning from this weed is frequent in the spring. Dr. Benoy comments on the less wooly and erect loco as follows:

"This specimen of weed is the purple bloom and has caused a great deal of trouble to cattlemen in this section since the grass has been grazed short. The cattle do not eat the weed when the grass is good. The symptoms are blindness, convulsions, loss of appetite and marked constipation. When cattle are moved from pas-

tures where the weed grows and given purgatives they generally recover in from ten days to two weeks."

I have not identified this loco weed beyond the genus Astragalus. The pods are more or less blackish when mature, curved and smoothish. The species adds another to the numerous loco weeds.

The salt sage, sweet sage or winter fat (*Eurotia lanata*) has been regarded as a forage plant of some value. Professor Thomas A. Williams says "One of the most highly prized of the sages is winter-fat or sweet sage. It usually fruits abundantly and the great fattening qualities attributed to it are no doubt, largely due to the fact that the mature fruits compose a large part of the forage obtained by the animals." It may be of interest to state that one species of *Eurotia* the *E. ceratoides* has saponin, which is injurious. It may be of interest to look into the matter of the injuriousness of salt sage or winter-fat.

Oak Poisoning

Forrest N. Fraseur, of Tipton, Iowa, writes as follows in a letter to Professor J. Buchanan:

"I have bought a tract of land which I am going to use for a pasture for cattle. In this, there are a lot of bur-oak trees and I have been told by experienced cattlemen that when the acorns off these trees start to fall cattle will sometimes take to eating them which most always results in killing them or in their getting so poor you scarcely would know they were your cattle. Have you any data on this sort of an experiment? If it is true, the only thing to do is to cut the trees and leave white oaks for shade, but I prefer the bur-oaks, as they make good post timber."

The bur-oaks are not generally considered poisonous, although gamble oak and shinnery oak which belong to the white oak group are known to produce poisoning. In the weekly news letter of the U. S. Department of Agriculture of April 23rd, I find this item on poisoning from oak leaves: "Belief among many stockmen in the grazing regions of the west that cattle were poisoned by oak leaves caused specialists of the United States Department of Agriculture to undertake experiments in 1915, the results of which have just been published in Bulletin 767, 'Oak leaf poisoning of Domestic Animals.' It has been found that the continuous feeding of oak leaves produces sickness of cattle, which frequently proves fatal. In order to cause sickness, however, oak leaves must make up a large percentage of the ration. If eaten with other feed, the animals are not injured. It was found experimentally that as small a quantity of alfalfa hay as three pounds daily, fed in connection with oak leaves, prevented poisoning. Most poisoning cases occur in the srping, because at that time there is a scarcity of other forage on the range.

"A symptom of the disease, although not always the first one to be noticed by the stockmen, is pronounced constipation. The affected animal appears gaunt, its coat is rough and its nose becomes dry and cracked. The attitude, both standing and walking, is peculiar: the head is extended forward and the animal shows depression, discomfort and sometimes evidence of pain. The animal grows rapidly weaker and may die at any time from a few days to a few weeks or more. As a rule, affected animals lose their appetites at an early stage of the disease. They refuse food but have a craving for water.

"Observation on the range and experimental feeding both show that some cattle may eat oak leaves for a long time with no definite bad effects, and some will even eat them exclusively with no harm. Generally speaking those that are injured show the results only after eating a considerable quantity through a rather prolonged period. Observations on the shinnery oak show that symptoms resulted after the animals had been feeding from 16 to 35 days.

"Judging from investigations thus far made, the specialists believe that oakbrush ranges can be used for grazing during the summer, not only with no harm to cattle but with positive benefit. To make certain that there is no loss from oak poisoning in early spring, when other forage is not available, it is important that an examination of the condition of the range be made before the cattle are turned upon it. There is no fixed date when cattle may be turned on range with safety, but if grass has gotten a good start there is little danger of oak poisoning."

Forage Poisoning

Two papers of interest on forage poisoning have recently been published by Robert Graham. A. L. Bruckner and R. L. Pontius.*

Altogether the Kentucky station has published six papers on forage poisoning. The papers give a good review of forage poisoning as well as the disease known as botulism. As there is some anology of botulism to forage poisoning the review is pertinent. Some of the recent important conclusions arrived at in an oat hay which caused a sporadic outbreak of forage poisoning are as follows:

1. An oat hay which had caused a sporadic outbreak of forage poisoning retained its virulence in storage for approximately twenty-two months. The etiologic factor in this forage proved to be water soluble and capable of causing symptoms of forage poisoning and death

*A Preliminary Report of an Anaerobic Bacillus of Etiologic Significance. Bull. Ky. Agrl. Exp. Sta. 207:49-113 *f.* 1-36. An Anaerobic Organism Isolated from Ensilage of Etiologic Significance, Bull. Ky. Agrl. Exp. Sta. 208:117-133 *f.* 1-6.

in horses after freely drinking the water from the oat hay.

2. *B. botulinus* proved fatal to horses and mules, subsequently to ingestion in wholesome feed, as well as by subcutaneous injection. The clinical symptoms and anatomic alterations accompanying artificial B. botulinus infection in horses and mules closely resembled the symptoms and gross anatomic lesions recognized in natural outbreaks of forage poisoning in central Kentucky.

Antitoxic goat, sheep and cow sera, prepared against *B. botulinus,* proved efficacious against lethal amounts of a homologous toxin. The antitoxic serum afforded protection in horses when administered subcutaneously and intravenously, and in guinea pigs when administered intraperitoneally, against a fatal amount of homologous toxin by the mouth.

3. An anaerobic organism resembling *B. botulinus,* isolated from a cecum of a horse fatally infected after drinking water in which the oat hay in question had been immersed, proved fatal to horses, mules and guinea pigs, administered by the mouth. The clinical symptoms and anatomic changes in horses experimentally infected with this organism proved to be indistinguishable from symptoms and gross lesions observed in horses as a result of feeding *B. botulinus.* This organism was recovered from a horse after death following a fatal artificial infection.

Antitoxic serum prepared against *B. botulinus* apparently provided protection in guinea pigs, administered intraperitoneally and in horses, administered intravenously, against infection by the mouth with a lethal amount of the organism isolated from the cecum of horse No. 91.

4. An anaerobic organism resembling *B. botulinus,* isolated from water in which the oat hay had been immersed, proved fatal to horses, mules and guinea pigs, when administered by the mouth.

5. The definite morphological, cultural and serological characters of the organism isolated from experimental horse No. 91 and of the organism isolated from the oat hay water closely ally them to *B. botulinus,* and to our knowledge constitutes the first time this, or an allied anaerobic organism had been definitely established as an etiologic factor in forage poisoning.

Chickens prove highly resistant to *B. botulinus* administered subcutaneously and by the mouth.

In regard to ensilage poisoning an anaerobic, spore-forming organism isolated from the oat hay previously referred to proved pathogenic for guinea pigs and horses. Two c.c. of the broth culture of the organism in question, disguised in wholesome oats, proved capable of engendering clinical manifestations and anatomic alterations in horses and mules similar to those recognized in afflicted animals as the result of feeding the original oat hay or water in which the oat hay was immersed.

Horse No. 121, weight 760 pounds, was given 2 c.c. filtered broth culture of the organism isolated from the silage, in 1000 grams of wholesome oats, at 10:30 a. m., June 3rd, 1917. No change was observed in this animal until the morning of the 7th. It was then necessary to assist the animal to a standing position. There was observed difficult mastication and an inability to drink. During the day approximately 900 c.c. of saliva dropped from the mouth into a metal feed box. The animal remained standing throughout the day, but on the morning of June 8th was permanently decumbent and no attempt to eat or drink was noted. Respirations were lowered and the feet were rapidly moved in a running motion at intervals. Enuresis was observed throughout the day. Death occurred during the night of June 8th.

Poisonous Plants

Several articles on poisonous plants have appeared in popular journals, largely because of the interest of persons who live in the cities and go to the country for a day or so and are unfamiliar with poisonous plants. W. G. Fitzgerald[1] mentions quite a number of poisouous plants in various parts of the United States. He states that in one year cowbane caused the death of seven children in New Jersey and that the Oregon hemlock caused the death of large numbers of cattle in Oregon. Frances Duncan[2] describes several species of poison ivy (*Rhus Toxicodendron R. vernix* and *R. diversiloba*), known variously as poison oak, swamp sumach and poison ivy. The Oregon water hemlock of the northwest, our common cowbane, are described. Attention is called to snow-on-the-mountain, American false hellebore, the stagger bush (*Leucothoe Catesbaei*) of southern United States, jimson weed, larkspur and black cherry. Mr. H. Maxwell[3] well known for his writings on out-door life, contributes an article "Our Only Poisonous Plants" in *Outing,* confining his attention largely to a description of the several poisonous species of Rhus. The paper or the article conveys the wrong impression, because our poisonous plants are numerous. It is probably true that more people are poisoned by poison ivy than by any other plants.

[1]Suburban Life, *5* : 150-152

[2]Country Life in America, *17* : 764-768, *3 f.*

[3]Outing, *67* : 465-471, *7 f.*

Descriptive Announcement of the Curriculum in Veterinary Medicine, 1919-20. Kansas State Agricultural College, Manhattan, Kansas. College Bulletin, Vol. III, No. 1, January 1, 1919.

POINTED OPINIONS ON LIVE TOPICS by Readers of Veterinary Medicine

It is in reports like those of this department that the current history of the progress of veterinary science is written. Are you leaving a record of your experience which will help others, as you have been aided by these and other clinical reports? If not, you are earnestly invited to contribute from your experience that this department may be of the greatest service to its readers. By so doing you will earn the lasting gratitude of those who are aided by your suggestions.

A Problem of Veterinary Education

Are you a success or a failure in your profession? Are you forging ahead or standing still, floating with the tide, or worse still, are you slipping back? Bradstreet's make the startling statement, taken from their records and investigation regarding the business, trade and professional failures coming to their notice, that in 1915, 74.4 per cent of the failures were due to the shortcomings of the individual himself, and 26.6 per cent to uncontrollable sources; in 1916, 81.5 per cent were personal, 18.5 per cent non-personal; in 1917, 85 per cent, personal, 15 per cent non-personal; in 1918, 86 per cent personal, 14 per cent non-personal.

L. A. Smith of Bradstreet's says: "So long as men who through ignorance, mental or physical disabilities, are disqualified for the winning of success, are permitted to engage in business, the percentage of failures due to incompetency is certain to increase and hold its place as chief cause of failures." Ernest T. Grug, president of the Philadelphia Chamber of Commerce, and a close student of economic success and failure, adds: "Lack of thoroughness, lack of proficiency and lack of application, make up the sum total of what is written in the book of business as incompetency. Competency can only be gained and maintained by intelligent application and education, not so much education obtained from books as from education in the chances, risks and special features of the chosen field of endeavor."

The above statements and statistics from men qualified to judge are startling and show the danger of embarking on life's work unprepared and unequipped with a well balanced education, which in our cases should be both scientific and practical. Who can deny, and is it not reasonable to suppose, that the veterinary profession furnishes its quota in the list of failure due to the reasons enumerated above?

Also it brings forcibly to the front the question of a probationary period for matriculants in our colleges. I have for a long time held that it is little short of a crime to allow some men to continue in a profession when it is apparent to fellow students and faculty alike that they never can succeed. How much better to give them a little friendly advice and let them go than to retain them and so perhaps rob some other field of human endeavor of an ornament, to create a failure and perhaps wreck an otherwise useful life.

Examining boards would do well to feature clinical examination and clinical work in their examinations. Many men could demonstrate with credit to themselves their ability to do certain things that they would find it very hard to detail and describe on paper, while others who can express themselves on paper might not be as proficient. The examiner has a hard task to perform. It is a serious matter to deprive a man from following his chosen profession, and the applicant for a license should be given every opportunity to demonstrate his ability to practice, and if a man could show me that he was qualified even if he found it difficult to tell me, and this were the only point at issue in his case, I would give him my O. K., and I believe he should have the opportunity to demonstrate his ability; otherwise, my position in the discussion of "Better Clinical Training Needed" would be untenable and illogical.

To return to the student, the faculty of a school should during the probationary period watch their students closely to locate the misfits. The city boy should be required to give special attention to the lectures in animal husbandry, a subject he very naturally is less proficient in than his classmate from the rural districts. And by the way, I think all colleges would do well to give this subject a little more prominence and not place it, as is so often done, at the bottom of the daily schedule, say from five to six o'clock perhaps once a week, and allow about half of the student body to "ditch" it after a long day's consideration of the more important subjects. In fact, I think it would

prove embarrassing to many of us if called upon without previous notice to make a little talk on livestock judging, types and breeding, feeds and feeding, or any kindred subject, and yet we should be able to acquit ourselves in a creditable way along these lines.

I am still of the opinion that until our schools enlarge their scope of clinical training, which I believe they are trying to do, one of the best methods of supplementing the college training is to be found in the apprentice system with accredited men. How much better this is than turning the young man loose between courses and allowing him to seek some isolated location and there practice alone. Is it not a fact that he will thus form more false premises than under the instruction of a capable preceptor? Some say it is a dangerous procedure, this apprentice system. Why so? Are the majority of the profession today so incompetent that the young man must be shielded from contamination by coming in contact with them? Who has made and constitutes today our profession if it is not the general practitioner? Are we fit only to count as members and pay our dues but to be intellectually shunned? One noted educator says of the apprentice system that it is an old idea now done away with, although he confesses that its underlying principle is good and sound, but systems like fashions change and come and go—some say, every seven years, and some things are resurrected from necessity.

To show that all the incompetency is not on one side, I quote from no less an authority than Dr. N. S. Mayo, who in the course of his official duties on the committee of intelligence and education of the A. V. M. A. says: "From a teaching point of view, the conditions in many of our schools have been terrible." In fact, the word "terrible" according to him hardly describes the conditions. Dr. Waite, a government inspector of educational matters, commenting on the condition of veterinary education, states that several of the colleges reported that all of their students passed every course that particular year without a condition, that only two per cent of all students in all veterinary colleges were conditioned and that in all the schools that year only one man was barred for poor scholarship, while in one dental school sixty-five out of the class were informed that their work was so poor they could not be retained, and in medical colleges the number of rejects was twelve per cent of the whole. Is this a merited compliment to the superior mental ability of our student body, or rather shall we consider it a doubtful compliment to our schools, or is our curriculum so easy that all may master it with ease?

If any school is afraid of unorthodox teaching, let it place its students with its own alumni and so perpetuate its classical teaching. No less an authority than Dr. Quitman in his analysis of the deficients, places half of the blame on the improper teaching methods of the schools and the other fifty per cent on the students themselves. If the schools dismissed even the twelve per cent that they do in medical colleges, it would help some and so change the ratio in favor of the student.

As regards state and private schools, the pot is inclined to call the kettle black. I think each has its advantages. As regards state schools, politics has always cast its blighting shadow across their paths, while the private school has always been tagged with the "for revenue only" sign; but I will say this for the private school, they have I think given the most practical course of instruction, and it always seemed to me that there was a closer bond of union between faculty and student than in the state schools. It is a fact that while the private schools have to bear the "for revenue only" tag, they are of necessity bound to deliver the goods or fail as people in this day and age demand value received, and this applies to schools as well as every other walk of life. I also think the private schools still have a work to do, and whether they survive to do it will depend entirely on how seriously they take the demand of the purchasing public to give "value received" at the present time. I should hate to see any more of the good private schools suspend.

It would seem that it has been my fortune or misfortune to have to pass through two reconstruction periods in my professional life. Nearly thirty years ago when I entered the veterinary profession, it was in the period of transition from the "horse doctor" age to that of the veterinary surgeon. The livestock interests of the country were in a bad way. Hollow horn, wolf in the tail and loss of cud were rampant, and murrains were a curse. Horses dashed madly about with hooks in their eyes and went blind with every new moon. Young pigs were dying from black teeth and older ones from stoppage of the vents on the inside of their legs. Every dog who frothed at the mouth was mad, and mad stones were a staple commodity. Castrations were done at the whim of the gentleman in the almanac with his bowels exposed, who long ago should have been arrested and jailed for indecent exposure.

But who can say that by painstaking effort and recognizing our shortcomings here and there and by an earnest endeavor to educate the laity as well as ourselves we as a profession have not made good? And judging by the past, we are going to continue to improve not by "cussing" but by discussing each problem as we meet it, meeting each other half way and recognizing the fact that wisdom is not going to die with any individual or class of individuals, and keeping to the front always the fact that we all have the best interests of our profession uppermost in our minds.

The general practitioner has an important part

to play in the upbuilding of the future of his profession; in fact, his part is fundamental and strikes at the root of the matter, touching as it does the student problem at the very beginning. How many young men enter the veterinary profession without first consulting with some member of the profession? Very few, if any. When the prospective student consults you regarding this very important matter, do you at once advise him to take up this line of work, or do you investigate him as to his ability and the advisability of his entering your profession? Would you recommend a stranger to your bank? I think not. Would you do less for your profession? You should not, but on the other hand, you should know him and so perchance not recommend a counterfeit. We ask the schools to detect the incompetent and misfit, but are we doing our bit? Their task would be much lighter if we all recognized our duty at the start.

Some men with little souls say they do not care how many incompetents creep into the profession and secretly hope that such men may drift into their territory so they may have easier competition. O ye of little vision and restricted horizon, can't you see that your own status must rise or fall with the standard of your profession in general? I would rather have for a competitor one who makes me sit up and take notice both professionally and socially than the measly incompetent who only serves to drag me down to his level. Get a vision beyond your immediate environment. Your country got it when she broke the shell of her isolation of over a hundred years formation, severed all binding traditions of her forefathers and invaded the old world for the good of humanity at large, expecting and asking no reward other than to make the whole world better and raise the plane of civilization. A man is no better than the company he keeps.

Pomona, Calif. JOHN L. TYLER.

A DOG WITH AN INSATIABLE APPETITE AND NO PANCREAS

A Collie dog, three years old, had been losing flesh for three months, was always hungry, ate great quantities of almost any kind of food it could get, several times the amount necessary for a large dog, and seemed never to get enough. It would go into the chicken yard and eat dry cornmeal or chops.

The fecal matter passed by this dog was of a light gray color, very greasy, had a sour odor and was very difficult to remove from a wood or cement floor. The passages were frequent, and the quantity at each passage was very great —in fact, one could hardly believe a dog could pass so much feces. The hair on the tail and hind legs was gummed up and very sticky and greasy.

The dog was thin and gaunt and had a hungry look in its eyes. It had been cared for by a person affected with tuberculosis, and the owner insisted that the dog was suffering from this disease and asked that a tuberculin test be made. The ophthalmic test was given and was negative. The dog was then destroyed and a postmortem examination held. The pancreas was completely atrophied, which I think accounts for the digestive disturbance and the defecation of all fats ingested.

Kansas City, Mo. J. C. FLYNN.

DE VINE A PRACTICAL MAN—HIS WRITINGS HELPFUL

I have been thinking considerable of reconstruction "the watchword of the hour," as it relates to, our profession, especially the older members. the non-graduates, and the one and two-year course college men, and how they could be benefited with selections of books from your new catalogue. How little those old timers know about practical obstetrics and therapeutics. I have participated in many consultations which gave me an opportunity to observe the shortcomings of these men.

I approve of your plans to make the Journal useful to every one in or attempting to enter our profession. De Vine is a practical man, free from "hot air" and the weakness of underestimating other men, and I admire his style. It helps us.

"Don't whine or grunt, but do your stunt," is a very useful maxim to guide us today.

I think the state veterinary sanitary authorities should tuberculin test all dairy cattle sold at auction. I recently saw two Holstein cows bought at public auction last autumn. I was called to see one of them. I had it killed and posted, found it to be an old chronic case. I saw the other one at a neighbors where I was called to see a bad test and the remainder of this thorough-bred herd was sold at auction recently, and will certainly spread the disease.

The Pennsylvania Live Stock Sanitary Board is mallein testing all horses and mules shipped into the state this year.

Dr. Marshall is on duty as state veterinarian. I understand that assistant state veterinarian Munce has retired to his fine farm near Washington, Pennsylvania. We lived a mile apart in our early days on the farm. Merino sheep were then our principal live stock.

I recently had a rather interesting experience when I was called to a stock farm in charge of a woman M. D. to remove a foal from a draft mare. It was a breech presentation with hocks flexed and resting on the brim of the pelvis. The removal or delivery was successfully accomplished. but the colt died. The mare subsequently suffered from laminitis and endometritis and died in six days.

Pittsburgh, Pa. JAMES A. WAUGH.

CAN YOU BEAT IT?

Last season I castrated a colt and removed two just as normal testicles as any colt ever had. I examined them thoroughly, for it was the first flanker I ever operated on. This colt never lost his sexual desire and will serve a mare just as quickly as any stallion and has one mare with foal. Can anyone explain this to me?

Reading, Mich. CARLYLE E. BLOSDALE.

Outbreaks of blackleg occur in sheep in the range country and are very severe. Likewise outbreaks of hemorrhagic septicemia occur in range sheep and the loss is very great. Blackleg vaccine stops the former and hemorrhagic septicemia bacterins are a specific for the latter. So far it is as one would expect.

BUT

How do you explain this? Blackleg vaccine will stop an outbreak of hemorrhagic septicemia just as promptly as the h. s. bacterins and conversely the hemorrhagic septicemia bacterins are just as effective as b. l. vaccine in checking an outbreak of blackleg in sheep.

Moscow, Idaho. E. T. BAKER.

DIGALEN SUCCESSFUL IN AZOTURIA

I wish to draw your attention to some results I have obtained in the treatment of azoturia from the use of Digalen, marketed by Hoffman-Laroche, New York. Previous to trying Digalen, my experience in treating this disease had been very discouraging as I had very little success with any line of treatment.

The three cases in which I have obtained favorable results from Digalen were all idiopathic with no history of injury, and the symptoms were well marked in each. One was a driver and the other two, work horses. The three cases made splendid recoveries but lost quite markedly in flesh; still, they were put back in work from five to seven weeks after they took sick. At that time they had regained their normal flesh, and they have remained well since.

In each case one tablet of Digalen was given daily hypodermically, together with the cathartic mentioned in the following article. The first case was discharged after seven doses; the second after five doses; and the third after six doses.

In reporting the result of this experiment with Digalen, I do so realizing that the result in three cases is not enough to warrant the conclusion that this drug is a specific for azoturia, but I should like to hear from others in the profession who have used this treatment or who may at some future date have a case of this disease and may feel disposed to give Digalen a trial.

I may tell you also of another experience I had with Digalen. A carter owner of two work horses was going home with one of them after a day's work, when suddenly the animal fell on the street and looked to the proprietor like a dead horse. As he was about ten minutes walk from home, he put the horse on a drag and took him home. He decided to telephone me, but when I got there the horse was dead, having lived only about thirty minutes after he took sick. As I had two other calls to make that same night, I could not hold an autopsy. I told the proprietor he should have called me the very first thing, and he answered that at first he considered the horse as good as dead and did not feel like spending any money on him.

Two days afterwards, his other horse was stricken in absolutely the same way. That time, as it happened only a few steps from my office, the owner ran for me. I found the horse lying flat in the street without movement of any kind. All I gave him was a dose of Digalen and he was placed on a drag and taken home. When he was about to be unloaded in the stable approximately fifteen minutes later, just time for the medicine to act, he stood up by himself and looked for something to eat.

Sherbrooke, Quebec. J. A. JANELLE.

A USEFUL QUICK-ACTING CATHARTIC

I have found the following a most useful prescription for the treatment of gastric and intestinal derangements:

Barium chlorid	4 drams
Strychnin	2 grains
Lobelin	1/5 grain
Boiled water	1 pint

Dose: Four and one-half to five and one-half drams for the first dose according to the size of the animal and gravity of the disease; three drams for the second dose, thirty minutes after the first dose; three drams for the third dose, one hour after the second dose. For one- and two-year-old colts, I give three drams every thirty minutes. I never have had to give more than three doses and oftentimes two doses are sufficient.

A strict diet for twelve to twenty-four hours according to the severity of the case, is absolutely necessary after an attack of indigestion. This medicine should be injected in the jugular vein. I always use a needle of gauge 16, and I never inject it before I see the blood run out of the needle in good shape.

The strychnin completely overcomes the depression of the barium chlorid, and the lobelin is a powerful antispasmodic and relaxant, increasing peristalsis and intestinal secretions. I have used no other treatment for digestive ailments during the last eighteen years and have had no accident or untoward result of any kind from it. The results have been wholly satisfactory.

I have also used the same treatment for heavy horses without experiencing any trouble. This treatment is inexpensive and easy to administer and is superior to any other. I always give two

doses of this prescription in all my cases of azoturia before I give the Digalen, and it does good work by emptying the stomach and intestines. This has to be done, because the cause of the disease is right there.

Sherbrooke, Quebec. J. A. JANELLE.

DOG LIVES TWO YEARS WITH PYLORIC ORIFICE CLOSED

I was called to see a male fox terrier, four years old and given the following history. At the age of two years this dog had suffered from an abscess at the base of the sternum. This abscess discharged freely for several days and was very slow in healing. The scar was deep and pitted and gave evidence of a good deal of tissue having been destroyed. When the abscess healed, the dog ceased to evacuate the bowels and for quite some time ate but little. It became emaciated and very weak. The food eaten would be retained only a short time, and then it would be thrown up.

After a while the dog's appetite began to improve, and he would eat a good meal, keep it down about two hours, vomit it and be ready for another meal. The dog was fed about four or five times daily and each time would retain its food about two hours, then throw it up. No evacuation of the bowels was seen by the owner who was positive that the dog could not live without defecating. He placed the dog in a small enclosure where he could be observed closely. He was under close observation for several weeks and there was no evidence of a bowel evacuation. The dog was then given his liberty, but was closely observed.

After two years the owner became tired of having the dog vomit about the house and decided to consult a veterinarian, and I was called in. I decided that the dog was slipping one over on them and that there was surely some bowel action taking place. After examining the dog, I could find nothing wrong except the deep scar before mentioned and the fact that he looked a little thin and not properly nourished. The owner stated that if there was no relief for the dog, he wanted it put out of the way.

I took the dog to the hospital for observation and placed it in a glass cage, three feet wide, five feet long and four feet deep, with a cement floor and sewer connection, and kept it under close observation for seven days. I found that the conditions were exactly as the owner described. During the entire time the cage was never soiled, except by urine and vomitus. The dog was in good spirits, was always hungry, would vomit in about two hours after feeding and would never reconsume his food.

I advised the owner that I was convinced medicinal treatment would be of no avail but that possibly an operation might relieve the condition. The dog was anesthetized, placed on the table and operated on. I found that the liver was adherent to the diaphragm, to the wall of the abdomen and was also firmly attached to the stomach. The scar tissues involved the pyloric orifice of the stomach until there was scarcely room to pass a knitting needle, making it impossible for food to pass. An effort was made to break down the adhesions between the stomach and liver with the result that hemorrhage was so great that I advised the owner not to attempt to save the dog, and he was not allowed to come from under the anesthetic.

On examination of the intestines, it was found that the walls were thin and shrivelled and the lumen practically closed, having the appearance of an unused organ. What open space there was left was coated with a brownish yellow stain which could not be scraped off, showing positively that no food had passed the bowel for a long period.

Kansas City, Mo. J. C. FLYNN.

THIRTY-FIVE GALLONS OF ASCITIC FLUID REMOVED FROM A MULE*

I was called a long distance to see a mule that was down and unable to rise. I found the abdomen of this mule enormously distended, and while in no particular pain, the animal was decidedly uneasy from being down so long. I gave her a mild stimulant by the mouth and also a hypodermic injection of strychnin, and with a little help we got the animal on its feet. I was not quite sure of my case. The abdomen was enormously distended but not with gas, and after deliberating for a time, I decided to puncture the abdomen. This I did, using my trocar, choosing a site on the lower surface, and to my intense gratification, my diagnosis proved to be correct, as I had diagnosed ascites. This was about eight o'clock in the morning and about half past eleven fluid was still running. We carried out pailful after pailful, altogether seventeen pailfuls. Thirty-five gallons of fluid at least were drawn from that mule's abdomen. At that, I didn't take all the fluid from the animal, as my trocar was not quite in the right place to do so. Afterwards, I left a mild tonic to be given by the owner.

In two days' time I was again called, and this time our poor old mule was in the throes of colic. I was there only an hour when I received an urgent call in another direction and had to leave my mule, and it subsequently died. The place was so far away that I didn't get back to hold an autopsy. The only thing I found out on inquiring into the history of this case was that the animal had suffered with influenza the winter before, and I presume we

*Presented at the Veterinary Association of Manitoba meeting, Winnipeg, February 18, 1919.

had a case of chronic peritonitis with this great effusion.

Morden, Manitoba. R. A. MacIntosh.

MESENTERIC ABSCESS CAUSING COLIC*

I was called to the place of one of my clients to see a case of colic in a mare. It appeared to me to be a mild case of indigestion. The temperature was 103° F., and the pulse between 60 and 70. The owner mentioned to me that this animal had never been well since she had had influenza and he wondered why. The temperature made me rather suspicious, so I requested the privilege of coming back a few days later after the effects of the colic had passed away in order that I might take the temperature when the animal was not under any undue excitement. On my second visit the temperature was 102° F., and I advised the owner to administer a tonic and to diet the animal using a good deal of bran. The tonic was composed of arsenic, nux vomica, cascara and gentian.

About a month later I received a call to see this same mare who was again suffering with an attack of colic. The symptoms this time were more pronounced, severe. However, she responded to a mildly stimulative treatment. I mentioned to the owner the possibility of an internal abscess causing this colic and told him if he was through working her, the best thing would be to turn her out on the grass for a couple of months. He followed my instructions and turned her out to pasture, where she stayed until harvest time.

About 10 weeks later I received a third call to see the same animal. Unfortunately I was a long distance away at the time, and when I got to the place, the patient was beyond the help of any veterinarian. I told my client that I believed she had ruptured her stomach and that in all probability there was a mesenteric abscess. On autopsy I was able to substantiate my diagnosis much to my gratification, for I found things just as I had predicted. The stomach was ruptured with a rent in it about eight inches long, and the contents were spread all over the abdomen. On further examination, I found the internal abscess in the folds of the mesentery possibly as large as a man's head. Included in it was a loop of the small intestine which was being gradually constricted and no doubt the primary cause of the periodic colic.

Morden, Manitoba. R. A. MacIntosh.

OBSTETRICAL CASE HANDLED ON OPERATING TABLE

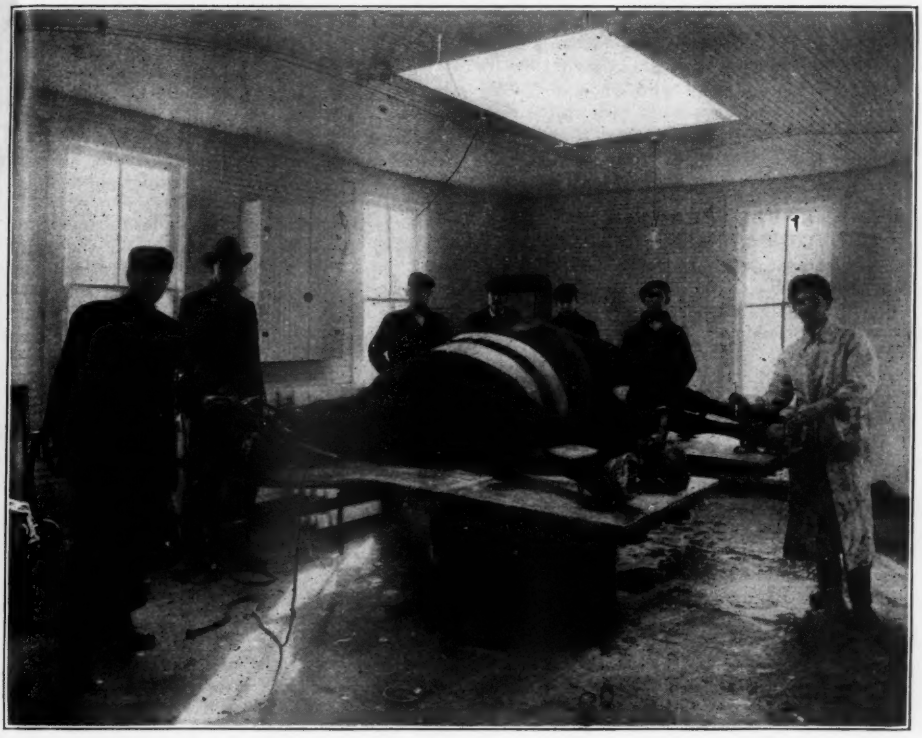
We were recently called out into the country to see a mare, weighing about 1,650 pounds, that was having difficulty in parturition. On making an examination, we found the colt was dead and presented in such a position that its delivery would necessitate considerable work. It was decided to bring the mare in to our hospital and put her on the operating table. We gave the mare 120 grains of chloral before she was started into town.

On arriving at the hospital, she was placed on the operating table and anesthetized. The colt was presented with both front feet coming and with the head down beneath the abdomen as shown in the accompanying illustration. It took us three hours to accomplish delivery, during which time the mare was under complete anesthesia, approximately eight ounces of choloroform being used. Pleuropneumonia

developed from the anesthetic and the mare died shortly afterwards. It might be remarked that we have experienced mechanical pneumonia from anesthetics in some of our other cases, but this is the only one in our practice in which the sequel was pleuropneumonia.

The point which we thought might be of interest in this case, however, is the use of the operating table in obstetrics. We do not recall having seen any reference to the use of the table in this manner and do not believe that such use is common among veterinarians, but we have fully decided that it is a good thing and shall employ this method in the future wherever possible. It makes the work easier and insures the proper surroundings for the per-

*Presented at the Veterinary Association of Manitoba meeting, Winnipeg, February 18, 1919.



formance of a scientific operation.

Covington, Ind. REDMON & CHEW.

FOR THE GROWTH AND PROSPERITY OF THE VETERINARY PROFESSION

In looking over the May Journal, I was agreeably surprised at the hearty response to my article on clinical training for young men, both from the general practitioner and the school men, and I was more than pleased to see that the school men accepted my criticism in the same spirit in which it was given; viz., a desire to improve conditions wherever possible, which I am sure they are trying to do. However, a frank expression from the profession at large will act as an incentive to better things. We in the field, in association meetings and otherwise, come in closer contact with these young men and can judge their capabilities and also their shortcomings better perhaps than their teachers, who seldom if ever come in close touch with them after graduation.

From private correspondence received by me and read somewhat inferentially, I am led to believe that my motives are misconstrued by some who imply that I am not inclined to give the young man his due or that I have a personal grouch or an "ax to grind," that I would like to teach or that I would like a government position or something else. Now, far be it from me to entertain any such thoughts. Nothing could tempt me to leave sunny southern California with its balmy climate and hundreds of miles of cement paved roads where motoring either for business or pleasure reaches its highest enjoyment, to say nothing of the lack of qualifications on my part for the work of other than a practitioner. No, my only motive is that actuated by a keen desire to see my profession prosper and grow in power and influence.

For nearly thirty years, I have given it the best that it was in me. A little over twenty years ago, due to panicky times and the low prices of horses, which at that time constituted most of our practice, I was moved by necessity to take up the practice of human medicine, which I followed a few years successfully; but the lure of my first love became so strong that I returned to the veterinary field and shall probably so continue to the end.

If I ever criticize my profession in any of its branches, you may rest assured that my motives are prompted by the high ideal of the greatest good for the greatest number. That my ideas are meeting with the hearty indorsement of the student body is shown by the number of applicants who wish to spend the coming summer with me in practice, and my only regret is

my inability to accommodate all of them. I have advised them to take the matter up with their instructors and obtain their advice and help in selecting a competent man with whom to spend the summer and by no means to give up the idea of thus spending their time between courses.

Pomona, Calif. JOHN L. TYLER.

REMARKABLE PERIODICITY IN NERVOUS ATTACKS IN A DOG

A lady came to the office and said that she had a male Collie, four years old, that spent its life in a small four-room cottage and small backyard. It could not be induced to take a walk with any one; consequently, had very little exercise and was constipated a great deal of the time. Of late it had exhibited the following peculiarities:

On Friday afternoon about four o'clock the dog would appear slightly nervous and restless and would walk about the room; there was marked rumbling of the bowels and frequent passages of gas at this time. At 7 p. m. the dog would have a spasm, twitch the eyes, work the mouth rapidly, snap the teeth together and work up a foam, fall over and lie quietly for a few minutes, then get up and walk about the room again. The next spasm would come at 7 a. m. Saturday, a third at 10 a. m. and a fourth spasm at 12 noon, then at uncertain intervals until 7 p. m. Sunday. He would have no more spasms until 7 p. m. Friday evening, three weeks later. This was repeated every three weeks, always beginning Friday evening at 7 p. m. with the prodromal symptoms at 4 p. m., and exactly the same program would be followed and finished on Sunday evening at seven o'clock. This had continued for more than two years without a break or change in the schedule of performances.

I prescribed triple bromides (15 gr.) at 4 p. m. on the Friday of the attack and pancreopapain compound (Abbott's) after feeding and put him on a light diet of dog biscuits and prepared meat four times daily. This aborted the spasm and the dog rested well. I advised the continued use of pancreopapain compound after each meal and told the owner to watch closely for a return of the spasms and administer the same dose of triple bromide as soon as she noticed evidence of their return. This she did with the result that the dog gave no trouble for about two months, when one night it had a slight spasm which was not preceded by the usual nervous condition and was not followed by it and has not been repeated.

This dog has remained well since, and the owner still relates its remarkable history whenever she can obtain auditors.

Kansas City, Mo. J. C. FLYNN.

RABIES WITH NO FURIOUS OR DUMB SYMPTOMS*

A small fox terrier, male, about one year old, snapped two small children playing in the street and was brought to my hospital for observation. The first day it seemed practically normal, did not snap or bite, ate and drank normally, and the temperature, pulse and respiration were normal.

The second day it was under observation, this dog developed a twitching in the right front leg. The leg would start to twitch and draw backward and upward along its side until it could get no higher; then the dog would tumble over on its side, get up and appear normal until the next attack. This was repeated at frequent intervals for three days. On the fifth day in the hospital, the dog grew weak and gave evidence of collapse. It finally became exhausted and lapsed into unconsciousness and died on that day. A brain examination was made and Negri bodies found. The children were then given the Pasteur treatment and did not succumb.

Kansas City, Mo. J. C. FLYNN.

DISCUSSION

Dr. N. S. Mayo: In connection with the rabies case that Dr. Flynn mentioned, regarding the animal having a spasm, I think probably a number of you have seen rabies in cattle and have seen the same condition there. They will frequently fall in a spasm and look as if they were going to die in a few minutes. The spasm finally passes away, and the animal gets up and is likely to chase you.

These very unusual and practical case reports have been very interesting. I wish to relate a case which occurred in the practice of a friend of mine. A woman was bothered with rats, so baited a fish-hook with meat, and her dog swallowed it. The dog was brought to Dr. Von Lloyd with the fish-hook and string attached. He cut a hole through a cork, threaded it onto the string, which was then taken through a tube, the cork thus pushed down into the dog's stomach clear up to the fish-hook which was pulled into the cork and then he withdrew the whole thing. I think the doctor demonstrated, ingeniousness, resourcefulness and a high degree of practicability, in handling this case so simply and successfully.

Dr. D. M. Campbell: I regard periodic epileptic attacks as a symptom of rabies in dogs. Unless there be a history of a recent attack of distemper, I always think first of rabies when an animal presenting the symptoms given by Dr. Flynn is brought to me. I have seen cases of rabies where at times both legs on one side were drawn up and the dogs would hop around, maybe

*Presented at the meeting of the Missouri Valley Veterinary Medical Association, February, 1919.

making several complete revolutions before falling and after a minute rising apparently normal. In unexplainable nervous attacks in dogs, think of rabies unless a history of distemper exists. It is a safe thing to do. I should count twitching and falling on the side a symptom of rabies unless some other explanation seemed apparent. I have seen similar periodic attacks following distemper and they were relieved somewhat by bromides, and other cases seemingly just like them were unaffected by bromides—this latter is an unfavorable symptom.

The Results of Investigations of Hemorrhagic Septicemia in Sheep in Colorado*

By I. E. Newsom, Ft. Collins, Colo.

THE losses of sheep in Colorado have been such during the past few years as to cause the authorities some concern, so that the agricultural college and the state veterinarian have been frequently called upon to investigate serious outbreaks of disease in these animals. The range sheep industry, while considerable, is in no way comparable to the feeding operations so far as money invested is concerned. The losses have in a few instances been rather extensive in range sheep, but could usually be attributed to eating some poisonous weed, or to the activities of over-zealous cattle men. The loss to the range men from other causes than those mentioned comes during the late winter and early spring at about lambing time, and affects both the ewes and suckling lambs, thereby injuring the industry at its source. While we have made some investigations of these latter troubles, we propose in this paper to deal more especially with a condition found in lambs in the feed lots.

We have in Colorado three main districts where considerable feeding is done. First, in the San Luis Valley where the range lambs are brought in in the fall and allowed to harvest the peas directly from the fields. In this district the losses have frequently been very severe and we must confess are not yet thoroughly understood. Second, in the Arkansas Valley, there is a surplus of alfalfa and this with Kansas and Nebraska corn has stimulated the feeding industry to a considerable degree. Third, the largest feeding area in the state, however, is located north of Denver, extending nearly to the state line north and as far east as Sterling. In this district there are annually fed about a million lambs. The prevalent practice is to ship the lambs in during the months of October, November and December and feed them for from three to five months, shipping them to market in the spring. It is in this latter district that our observations have been largely made and of which we shall speak with most assurance.

Under these conditions, the heaviest losses are usually noted during the first few weeks after the lambs are placed in the pens and most frequently begin within ten days or two weeks after arrival. For many years we regarded these losses as being due largely to over-feeding and irregularity of feeding with grain, as we frequently found gastro-enteritis on postmortem examination. In other instances a diagnosis of pneumonia was made and was considered sufficient because it could usually be explained by exposure and untoward conditions in shipping. After conducting some feeding experiments, which were particularly planned, for the purpose of finding out under what conditions grain would kill sheep, we came to the conclusion that our explanation of the heavy losses was insufficient. About two years ago, we began to find bipolar organisms with considerable regularity and since that time have attributed a considerable portion of the loss to hemorrhagic septicemia.

We reported on our findings during last season at the A. V. M. A. meeting at Philadelphia last summer so that this paper will deal largely with material gathered since that time. We have investigated twenty-four outbreaks since October 1st, but a detailed description of two or three lots with which we have worked must suffice as being typical of the usual findings.

Lot No. 38.—This lot consisted of 1,800 apparently strong lambs. They were put in the lots on November 20, 1918, and by December 1st the loss began to attract the owner's attention. In the next seven days approximately 80 head had died. The animals were getting all the alfalfa hay they would eat, and were just beginning to eat a little barley. On December 6th, the local veterinarian, Dr. R. N. McCarroll, brought to the laboratory a sick sheep from this band. It showed considerable dullness, loss of appetite and a slight mucopurulent discharge from the nose. The temperature was 106.9° F. A dead lamb brought in at the same time showed on autopsy a considerable number of subcutaneous and intermuscular hemorrhages. All lymph glands were very much swollen and deeply reddened. The mucous membranes of the phraynx, larynx and trachea were very deeply reddened. There were numerous subserous hemorrhages on the diaphragm in the lung tissue and

*Read at meeting of the Missouri Valley Veterinary Association, Kansas City, February, 1919.

under the costal pleura. A considerable number of subepicardial hemorrhages were also present. Several subcapsular hemorrages were to be seen on the spleen. There were subperitoneal hemorrhages on the diaphragm. Twenty-five c.c. of blood from the live animal were injected into the jugular vein of another sheep. This sheep never showed any signs of illness. From the dead sheep three rabbits were inoculated respectively with one c.c. of spleen, heart blood and lung emulsions. The first two rabbits died on the night of December 13th; the third one survived.

On December 7th the place was visited by the writer in company with the local veterinarian, where several sick animals were found and one died while we were present. The temperature of this one just before death was 106.8° F. The local veterinarian began vaccination. The dead sheep was brought to the laboratory where autopsy showed approximately the same conditions as previously described. Smears made from from the heart blood, tracheal mucous membrane, liver, kidney and lymph gland all showed bipolar organisms. Five rabbits were inoculated as follows: No. 1 with 1 c.c. of lymph gland emulsion; No. 2 from the spleen; No. 3 from the lung; No. 4 from the heart blood and No. 5 from a tracheal scraping. Of these No. 5 was dead the following morning, No. 3 was dead two days later and No. 1 died two days after No. 3. Nos. 2 and 4 survived. A pure culture of bacillus ovisepticus was procured from rabbit No. 5 and 10 c.c. of a 48-hour bouillon culture given to a healthy sheep on December 12th. By the next morning this sheep was dead. Postmortem findings were as follows: There were no subcutaneous hemorrhages, the prescapular and submaxillary lymph glands were swollen and deeply reddened. The precrural and popliteal were moderately hemorrhagic. The trachea and larynx were deeply reddened and the trachea filled with foam. There were approximately two pints of straw colored fluid in the thoracic cavity. Several pin point hemorrhages were present on the heart, and some in the lungs. There were no hemorrhages on the diaphragm or under the costal pleura. The mucous membrane of the fourth stomach and duodenum was moderately reddened. A few hemorrhages were present under the serous membrane of the small intestine. Smears from the lung and heart blood showed numerous bipolar organisms. Cultures made from the heart blood gave bacillus ovisepticus. Vaccination was finished on the original band on December 7th, and followed that night and the next day by a very cold, disagreeable rain. During the night of the 7th, four of the sick animals died and during the next two or three days the total loss following vaccination was brought up to eleven, since which time there has been no further loss in this band. The place was visited on February 1st; the animals were looking well and the owner well pleased, as he had some serious losses in previous years.

Lot No. 33.—Consisting of 800 small weak lambs purchased on the Denver market about November 2nd. These were visited in company with Dr. R. C. Swallow, of Fort Morgan, on November 16, 1918. Twenty-five or thirty had been lost, eight of which had died within the previous twenty-four hours and a considerable number were showing signs of illness; that is, mucopurulent discharge from the nose with dullness and loss of appetite. Temperatures averaged from 102° F. to 106° F. Several were scouring. Post-mortem examination of three showed approximately the same lesions. The lymph glands were swollen and reddened, mucous membrane of the trachea, larynx and bronchial tubes was deeply reddened, the lungs were somewhat engorged and in one there were numerous subepicardial hemorrhages on the heart, also a number of subpleural hemorrhages, particularly over the diaphragm. Plucks were brought to the laboratory where on November 17th heart blood emulsions were inoculated into two guinea pigs and one rabbit, and a spleen emulsion into one guinea pig, and 10 c. c. of a combination of heart blood, lung and spleen emulsion were given to a sheep intravenously. By the next day at noon one of the guinea pigs died, cultures and smears showing bacillus ovisepticus. By the following day pig No. 2 was dead, cultures and smears showing a bipolar organism. On the 20th, pig No. 3 inoculated with spleen emulsion, had died, cultures and smears showing the same as above. The rabbit died on November 23rd. Smears from the area around the point of injection showed bipolar organisms in large numbers. Cultures gave a pure growth of bacillus ovisepticus. On November 25th, a healthy lamb was inoculated with 10 c. c. of a 48-hour bouillon culture made from the first guinea pig. By the next morning the lamb was down, very weak, mucopurulent discharge from the nostrils, temperature 106.2° F. This lamb died on the 29th with postmortem findings typical of hemorrhagic septicemia. On November 26th, another lamb was given 10 c. c. of a 48-hour bouillon culture made from the second guinea pig. This animal was dead on the following morning. Postmortem examination showed the usual lesions. Pure cultures were obtained from the heart blood. Five c. c. of heart blood of this animal were inoculated intravenously into a sheep and ½ c. c. intravenously and ½ c. c. subcutaneously into rabbits. By the following morning one of the rabbits and the inoculated sheep were dead. Cultures of a bipolar organism were obtained from both of these animals. On the 29th, the second rabbit died showing also bipolar organisms in smears and cultures. November 29th, a healthy lamb was given by the mouth 25 c. c. of a 48-hour bouillon culture made from the first guinea

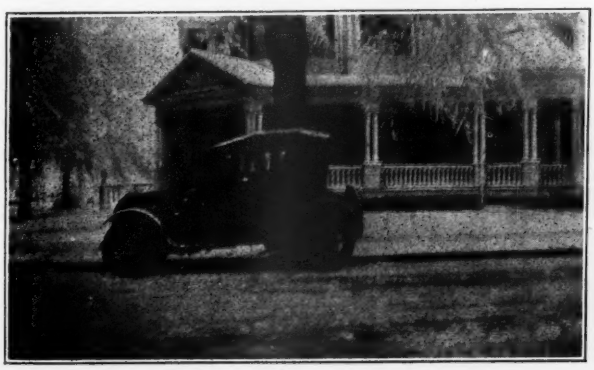
pig and 35 c. c. of a similar culture made from the second guinea pig. This lamb never showed any signs of illness.

The original band was vaccinated on November 17th. There had been a loss prior to this time of 43 head and 103 animals were noticeably sick at the time of the administration of the vaccine. After vaccination 106 animals were lost. On December 24th, what was left of the band was looking well and the owner felt satisfied with the results.

These cases might be added to very materially but space and time forbid. We are not always able to isolate the bipolar organism from these outbreaks, nor do we find that all of our inoculated animals die. We have, however, been able to isolate an organism from various parts of the body of sheep dying, with which we have time and again produced similar symptoms and lesions in healthy sheep. We feel, therefore, that the evidence in favor of hemorrhagic septicemia being a serious disease in sheep in Colorado, is stronger than it has ever previously been. In reading the description given by Lignieres in Argentine and Miessner and Schern in Germany, we are struck with the similarity of their outbreaks to ours.

If our disease is hemorrhagic septicemia, then we have seen it in the various forms which are commonly described in our text books. In some instances, it develops very acutely with profuse hemorrhagic lesions throughout the body, killing large numbers of sheep in a very few days. One such instance reported by our state veterinarian, Dr. Lamb, was followed by a loss of approximately 1,000 head out of a band of 2,100 within three days. We have ourselves seen 63 animals die within a period of 24 hours out of a band of 4,000. The total loss in this band was approximately 200 within about ten days' time. We have also the pneumonic type in which the animals live for several days after showing symptoms and finally die with considerable solidification of the lungs and frequently a suppurative pleuritis. One of the first outbreaks studied was of this type. Again lesions of gastro-enteritis are quite prominent and it was this condition that led us for so *many* years to *believe* that our trouble was probably a feeding proposition. The cerebral type is more prevalent in lambs that have been on feed for some time and are in a good state of flesh. They may stand for hours pushing against the side of the feed rack and if moved will run wildly and often in a circle. When they go down they lie for days in a comatose state with the head turned to one side. Autopsy on these animals often show no lesions except reddening of the nasal mucous membrane and an occasional solidified area in the lung. Chronic lesions are associated with emaciation, necrotic areas in the lungs and liver and ulceration in the intestinal tract.

We are aware of the objection which may be brought against our conclusion on the basis that a bipolar organism may be isolated from many normal sheep. We have ourselves succeeded in isolating one such organism which appeared to be just as virulent for both rabbits and sheep, as those which were taken from outbreaks. We do not, however, feel that these findings need interfere with the general conclusion. It is a well known fact that the pneumococcus which is now believed to cause a large percent of the pneumonia in man can be isolated from the throats of many normal individuals, and in some instances a virulent form of this organism can be had from such sources. While we believe that the bipolar organism is responsible for much of our trouble, we are not unmindful of the fact that predisposing factors are of great importance. The very fact that most of our feed lot trouble develops within ten days or two weeks after the lambs are brought into the yards, indicates that shipping and the exposure incident thereto is one of the big factors in the disease. Whether this shipping means that they are exposed to a virulent organism, or that it merely lowers their vitality so that the organism normally present may become virulent, is of course unknown. It would seem that any factors which tend to lower the vitality of the animals strongly predispose to the disease. On the other hand, we have frequently seen sheep that were



A COLD WINTER MORNING

Dr. L. J. Herring, of Wilson, N. C., in his car in front of his residence, preparatory to making his round of calls. Dr. Herring was recently honored by election as alderman from one of the most progressive wards of this thriving, wide-awake town of 14,000 inhabitants. This is only another instance of the recognition which is being accorded members of our profession, as progressive, trustworthy citizens, standing for the best interests of the community they serve.

apparently at the height of vigor, dead from this disease, so that it is not necessarily confined to weak, thin lambs.

In spite of the fact that many investigators have shown that a dead organism gives little immunity to this disease, field observations seem to strongly indicate that vaccine should be recommended. Our own laboratory experience is too limited on which to base conclusions, but it points toward a greater immunity being had from an organism which is yet alive. In this respect it is in line with the observations of Lignieres. Field observations on vaccinated lots are of course difficult of interpretation since we can never vaccinate and leave unvaccinated at the same time. Neither has it been possible at this writing to vaccinate half of the band and leave the other half untreated. We can only give the figures such as they are, and guess at what might have happened had we not administered vaccine. There are of course herds where vaccine has not been administered and where losses have stopped just as suddenly as it did in other herds that were treated. On the other hand, there were bands where no vaccine was administered and where the losses were very severe. We do believe that in the acute type of the disease the largest loss usually comes within the first week, and that even though vaccine were not administered the disease would gradually die out. In the more chronic types, however, we have waited in some instances for from three to four weeks, but with no abatement of the disease until after vaccine had been administered. We are giving herewith a record of the vaccination with which we have had directly to deal during the past season. This does not mean that we have administered the vaccine, which has in every case been done by the local veterinarian. Neither is this a complete record of all of the sheep vaccinated in the state. It is only a record of those bands in northern Colorado which came directly under our observations and on which we were privileged to do some investigational work.

The determination of the number sick is always an estimate as no accurate method was used. The number given in the table represents the report of the veterinarian who did the vaccinating or the estimate of the owner. While the satisfaction of the owner is not always a measure of the real value of the service rendered, yet if vaccination is to be practiced, this phase of the matter must not be overlooked. The whole question in its final analysis is an economic one and will stand or fall on the owner's belief in its efficiency. To those who may say that vaccination has been pushed before the real cause of the disease has been finally determined, I can only say that we were willing to try anything that offered a chance of success in preventing our serious losses and that following the reproduction of all of the essential manifestations of the disease with pure cultures of bacillus ovisepticus a trial of vaccination was the natural consequence. It is, however, still on trial and must be judged by its results. I am hoping next season to be able to vaccinate one-half of a large number of bands as they are put into the pens so that accurate records may be had on thirty-five or forty thousand head.

Acknowledgment.—I am deeply indebted to my assistant, Dr. W. H. Feldman, who has done much of the laboratory work and to a consider-

RECORD OF VACCINATION

Lot No.	No. in Band	Date of Vaccination	Lost before Vaccination	No. sick at Vaccination	Lost after Vaccination	Last Date of Report	REMARKS
33	800	11/17/18	43	103	106	12/21/18	None sick, band looking well. Owner satisfied.
34	1000	11/21/18	18	0	10	12/19/18	Owner dissatisfied. Shipped lambs Dec. 18.
35	1060	12/ 3/18	6	10	5	12/24/18	Owner satisfied.
36-a	1000	12/ 5/18	30	20	10	12/20/18	Two lambs still sick. Owner satisfied.
36-b	1000	12/ 5/18	11	60	19	12/20/18	Owner satisfied.
36-c	500	12/ 5/18	12	20	4	12/20/18	" "
37	2000	12/ 7/18	9	28	6	12/19/18	" "
38	1800	12/ 7/18	80	25	11	2/ 1/19	" "
40-a	700	12/15/18	20	....	12	2/ 3/19	" "
40-b	787	1/ 4/19	18	....	0	2/ 3/19	" "
45	486	12/30/18	20	2	10	1/ 7/19	
46	2250	12/30/18	75	12	15	2/ 3/19	No recent loss.
47	1250	12/13/18	24	....	2	2/ 1/19	Owner satisfied.
48	1000	1/ 2/19	23	1	6	2/ 1/19	" "
52	4000	1/ 6/19	80	1000	120	2/ 1/19	" " Five still sick.
54	200	1/14/19	12	0	0	1/27/19	" "
55	1000	1/24/19	7	....	2	2/ 1/19	" "
	20,833		488	1281	338		

able percentage of the practicing veterinarians of the state who have cooperated so nicely in the investigations.

DISCUSSION

Dr. Mayo: I would like to express my appreciation of this splendid and unbiased presentation of this subject. I emphasize the "unbiased" because it is difficult for one who is working on such a problem as this, to keep himself in a judicial frame of mind to weigh the evidence. Dr. Newsom spoke of the vaccine. I infer that this is a bacterin made from the B. ovisepticus.

I think that the number of doses given is important. It is pretty well established that while the first dose of bacterin gives a certain degree of immunity, the second dose more than doubles the immunity given by the first dose. The third increases the immunity, but is not relatively as important as the second dose. There is another question that occurs in connection with this, and that is, has it been found that the different strains of this bipolar organism vary considerably in their virulence, or are we to conclude that the failure to cause death from these organisms is due to the natural immunity of the animal inoculated?

Dr. Kinsley: I also want to ask the Doctor a question. Predisposition seems to be a very important factor in hemorrhagic septicemia in sheep. Have you conducted any experiments in immunizing lambs at the public stock yards before leaving, and do you think that is the place to do it?

Dr. Murphey: Is this condition confined to sheep on feed, or that are found on any of the range land?

Dr. Schonenberger: The first experience I had with this, was about four years ago, and since that time I have treated about 20,000 head. There is more trouble with it in sheep that are in a run-down condition than in sheep that are in the best of condition. My experience has been that there would be probably 10 per cent that I would have to re-treat in ten days. As for the lesions, I do not go by them. I always get a laboratory diagnosis. There is one symptom that I find common. That is a twitching of the ears, and a gritting of the teeth. This is more marked in a sheep that lives several days. In treating them, it is necessary to watch and see if they are getting food of high nutritive value, especially if having a heavy loss. I can say that I have found the condition in practically every breed of animal. I have never had any trouble in controlling it except in instances where the animals were in a run-down condition. There was one herd that I treated three times last year, and they were not getting anything but oat stock. They did not weigh as much as good lambs should. We apparently got control even in that case.

I believe there is one thing too many of us make a mistake about, and that is, when we get an infectious disease in sheep, we do not get a laboratory diagnosis. If I don't get a diagnosis the first time, I send in some more material. In my work, I just tie the arteries and the veins of the heart, pack it in a gallon bucket with some ice, and send it on.

In my territory the majority of the sheep die with hemorrhagic septicemia. There are some parasitic troubles, too, but the biggest trouble I have is with hemorrhagic septicemia.

Dr. Hall: There is one other point. I am talking from my experience in feeding. When you start feeding a bunch of sheep, you will have some death loss. The autopsy will show hemorrhagic septicemia, and you will have a laboratory diagnosis of hemorrhagic septicemia. I am pretty careful about telling the owner that he will lose all of his sheep if he does not vaccinate. Sometimes there will be losses when the sheep are first put on feed. I believe it will usually stop without vaccination if you are particular in feeding them. A lamb in an emaciated condition is more apt to take hemorrhagic septicemia than any other lamb. Pay particular attention to your feeding when you start to vaccinate these lambs for hemorrhagic septicemia.

Dr. Murphey: We have found a great deal of our trouble has been due either to the man starting in the sheep business and over-feeding the sheep, or feeding them scenery, or something of that kind. I have in mind a band of over 400 sheep; 125 died. The sheep were vaccinated with bacterins and kept on dying. It looked suspicious and I had the owner tell me what he was feeding. I could not find out a very good reason why they were dying. The diagnosis of hemorrhagic septicemia appealed to us at the time. When the sheep kept on dying, I went back and met the father-in-law of the man owning the sheep. I found out he was practically starving them. He had not been giving what he said he had. He thought they would eat brush, etc. Another cause of this condition is the feeding of silage. In one instance there were 25 or 30 animals in a bad shape, and ten dead. The post mortem examination showed hemorrhagic areas. I told the man to take his sheep off the silage. The losses immediately stopped. In conjunction with the use of bacterin, you must be careful about the diet.

A Member: In regard to the conditions mentioned, I want to say that I have had a few bunches of sheep in my territory, where the symptoms were like mad-itch in cattle. The ears swell and thicken; the eyes would be closed, and they would go blind; they grit the teeth and as long as they are on their feet will paw with the hind feet and tear the skin, and rub the head on a wire fence. They finally die. Sometimes I have had twenty in a bunch of 250 lambs. All this condition occurs in lambs. They

would be in good condition and apparently on good feed. I would like to ask whether this is mad-itch or hemorrhagic septicemia.

Dr. Miller: The Doctor gave a description of bighead in sheep. You will sometimes find it when the animals are foundered on buckwheat. It is found in Idaho, and there is about the same condition found in Iowa and Missouri. It has no connection with hemorrhagic septicemia.

I would like to ask Dr. Newsom a question. Are you familiar with the work that we have been doing in the San Luis Valley this winter, and if so, have you drawn any conclusions from those experiments?

Our difficulty has been in handling hemorrhagic septicemia. I feel that I am not in a position to discuss hemorrhagic septicemia from the standpoint that we can make a positive diagnosis of the disease. It may be that our experimental work will reach a stage where we can make a positive statement. I would rather not make any now.

Dr. Harrison: I have not had much sheep experience. My experience has been with goats. I am sorry that my sheep practice has been so limited. A short time ago, I was out to see a bunch of 3,000 goats which had been shipped in from New Mexico. There were probably 1,000 sick. I thought they had hemorrhagic septicemia, and sent some material to Dr. Kinsley for diagnosis. He said it was hemorrhagic septicemia, and they were treated for that. They are now doing nicely.

Dr. Newsom: Dr. Mayo asked as to whether one vaccination had been given, or two or three. In this series (which has all been taken since last October) all were vaccinated once only. In the series reported last summer, the bands were vaccinated two times. I feel reasonably sure that two vaccinations are better than one, and that three will be better than two. I am hoping some of our good biological houses will put out a vaccine for these diseases similar to the typhoid vaccine now put out in the army. Up until this summer, three vaccinations were common, but this material is now being put out in one vaccination, but is prepared in a different way. I believe it would be better if there were a larger amount of material, possibly mixed with fatty material so it would be absorbed readily, and a larger amount at one dose could be given.

I also was asked about the variation in virulence. That is, did the organisms which were used vary in virulence, or were the inoculated animals more susceptible in one case than in another? I presume that both were true. The animals probably do vary in susceptibility, and also in vaccinating, we will get more material, or more virulent material in one animal, than in another.

Dr. Kinsley brings up a very important question. He thinks these animals should be immunized as they leave the yards. That is something that is interesting us very much. In this feed-lot trouble, most of the loss comes in a short time after the animals are put into the lots. If those animals could be immunized before they ever reached the lots, or before leaving the range for other yards, it would be a fine thing. We are willing to suggest to the owners that they vaccinate these sheep as early as possible, either when leaving the range, or in the lots. However, it is only when one has a serious loss that he will consider the treatment of the animals. If the losses continue as they have in the past few years, some men will want to vaccinate the sheep when putting them into the lots.

Then there is the question of a laboratory diagnosis. I will probably get into a little trouble because of my statements on this. I said a bipolar organism could be isolated from a normal animal. The finding of a bipolar organism by laboratory examination is not sufficient to establish a diagnosis of hemorrhagic septicemia. On the other hand, the negative finding does not mean that there is no hemorrhagic septicemia in that band. I feel very confident of the truth of those statements. In some bands where I was sure from other evidence that hemorrhagic septicemia existed, I would get specimens that showed no bipolar organism. Simply because you select a little material from one animal and send it to a laboratory and get a statement that the bipolar organism is present or absent, does not in my opinion confirm or deny a diagnosis of hemorrhagic septicemia. I do not believe that diagnosis is on a safe enough basis yet so that we can do that. When considered with the symptoms and lesions present, then the laboratory diagnosis is valuable. The laboratory is undoubtedly of great value in these cases, but as Parks says in his book on bacteriology, as the physician in order to use a laboratory must use intelligence, so must also a veterinarian.

A question was also asked as to where the bacterin is injected. We injected it into the axillary space. The material is injected rather deeply into the tissue of that region.

The question of over-feeding was brought up. I would like to have our records to show that our experiments in over-feeding did not kill sheep. We started out with the idea that most of our troubles were due to over-feeding. We took bands of sheep and tried to over-feed them. We gave them all the grain they would eat, and barley, corn chop and peas. One animal ate two and a half pounds the first day. It had never eaten any grain before. In that series we lost one lamb, and the feed did not have anything to do with its death. Sometimes the lambs will over-eat, and will scour a little. But they do not die. I am not saying overfeeding will not kill sheep, but it did not do it in our case.

A change of ground was brought out. We

have a number of bands on record where the animals started to die, were changed to new ground, and the losses ceased. A change of ground is desirable. In a feed-lot, however, a change of ground is not feasible.

The condition which was described as bighead, I have never seen. The description does not conform to anything which I have called hemorrhagic septicemia.

The question was raised as to whether we are familiar with the work done by the government in the San Luis Valley this year. We are quite familiar with that work. We have been able to isolate bipolar organisms in two instances from material sent from there. The work done there indicates that vaccination there was not effective. There seems to be reason to believe that the disease there this winter is due to some other factor. From my experiments a few years ago in the feeding of peas, I do not believe it is due to over-feeding on peas. I said in my paper that the disease in the San Luis Valley was not thoroughly understood. The government authorities are in full accord with us in that phase of the work.

CALCIUM AND PHOSPHORUS FOR DOGS, HOGS AND CATTLE.

With reference to carbolic acid for "downers," page 238, May issue, and puppies that die from dietetic deficiency, also conditions due to dietary errors, page 305, June issue, while I dislike to appear to do so, these cases are so very much in need of proper treatment that I cannot refrain from just "butting in" a little bit. The answers to these queries are so evasive that perhaps what I have learned from my own experience and other experimenters such as Henry and Morrison will help some brother practitioner who has not had the time or perhaps inclination to post up by studying the experiments of others.

In the case of the "downers," nearly every one can be saved by giving a liberal supply of calcium and phosphorus, and there will never be any "downers" in a herd that is supplied with these materials.

With reference to the puppies, the correction of the condition is very simple. Dr. White says that a meat diet is necessary, which is good treatment; but if you want to be successful in raising strong, healthy pups, remember you have to supply mineral matter for the mother to build the skeletons of the litter in utero, and the very best source of this is green bone cut the same as for poultry feed. It not only carries the lime necessary but also is the best source of phosphorus which is very essential.

Concerning the cattle with depraved appetites, this is just another case of lack of mineral matter in the diet. The mixture that G. W. J. is feeding will do little or no good. Turning them on grass as suggested will benefit, and if the green feed is alfalfa or white blossom sweet clover, the condition will disappear almost immediately. The real thing to do is to supply a liberal amount of calcium and phosphorus, which will correct the disorder in two or three days. It should be remembered that alfalfa hay has fifty pounds of calcium per ton and clover, about forty. If these two feeds are withdrawn and cattle left to timothy or corn fodder, which has only ten and eleven pounds respectively, there is sure to be mineral starvation, and in their frantic efforts to obtain mineral matter, cattle will eat almost anything.

Sioux Falls, S. D. FRED EVANS.

INFECTION OF THE ELBOW JOINT IN A MULE

In January, 1918, a black mule, seven years old, was kicked by a horse on the external surface of the foreleg just over the humero-radial articulation, the integument being cut through only in a small place. When I was called two days later, the animal was in very great distress. Explorations with the probe revealed only a shallow cavity. Hot fomentations were applied with antiseptic injections daily.

The case was not seen again until fifteen days later, at which time a very large and painful abscess had formed just above the primary opening involving all of the lower portion of the external brachial muscles. It was lanced and discharged fully a gallon of thick, creamy pus.

One month later the animal was still very lame, and atrophy of the entire shoulder was under way, having extended up to and involved the antea-and postea-spinatus muscles. Hypodermic injections of a combination of alcohol and rectified spirits of oil of turpentine were made along the lower border of the cartilage of prolongation of the scapula. This had the effect of forming several abscesses lower down, but had no appreciable effect on the atrophied muscles. The animal was seen at about three week intervals and a course of polyvalent bacterins was given, but continued to grow worse. Several abscesses formed down in the antebrachial muscles, which were lanced only to form again. The primary wound healed several times only to form a new opening. Four months after the animal was injured being then

suffering from pyemia and in a very badly emaciated condition, it was destroyed.

The carcass was dragged to a lonely spot on the mountain among the big pines and left to the tender mercies of the elements and any stray dogs or wild animals that might pass that way. However, I took a knife and removed the affected leg from the body, climbed a small beech tree nearby and with some strands of hay wire attached it to a limb out of reach of the night marauders.

No more was thought of the incident until a few days ago when I chanced to be riding through the woods on the hunt for some stray cattle, when my horse stumbled over something in the leaves, and looking down I saw a clean skull of the equine species ,and I then thought of the unfortunate mule, and glancing around, sure enough there still hung the leg in

the beech, now only the bone, remained, having been picked clean by the hungry crows and washed by the rains and snows of the winter. I climbed the tree, got the leg down and secured the radius, ulna and humerus. I then hunted around in the leaves and found the radius and ulna of the unaffected front leg. I attached them to my saddle, and on arriving home I had my brother take a picture of them. The radius and ulna of the affected leg are shown on the reader's left and those of the sound leg on the right, while the humerus of the affected leg is in the middle.

Just what the nature of this infection is I am unable to determine owing to my limited microscopic equipment, but it is evidently something that produces a rarefying osteitis. I should be glad to have the opinion of some brother practitioner on the subject and should like to know if any veterinarian has ever cured a case of this kind. Personally, I will say that in the future if I am able to diagnose a case as infection of the elbow joint, I will not attempt treatment.

Winfield, W. Va. REMBRANDT MORGAN.

NEW YORK CITY VETERINARY MEDICAL SOCIETY MEETINGS

March

Dr. Thos. B. Rogers of Woodbury, N. J. gave an address on "New Pharmacopeia." Dr. Rogers advocates a veterinary pharmacopeia and said in discussing the matter that the suggestion had come to him by an authority, that a veterinary section be added in the new U. S. Pharmacopeia. He believes that the veterinary profession needs representation on the committee of revision of the new pharmacopeia as there are certain important preparations now used by the veterinary profession that are not recognized in the present pharmacopeia. Speaking of the quantity of drugs used in the veterinary profession, he said an advantage could be taken of preparations that could be prepared at less cost; for instance, some of the fluids extracts, where the acetic extracts could often be used in veterinary practice quite as satisfactorily as the alcoholic. Dr. Rogers' discussion made plain his vast knowledge on the subject of pharmaceutical medicine and he brought to the attention of his audience some splendid practical suggestions.

He read a letter from Dr. La Wall, Chairman of Committee on Revision, inviting the A. V. M. A. to make formal application for representation on the committee for the revision of the U. S. Pharmacopeia. The society asked Dean Hoskins to take charge of the correspondence. Dr. Rogers address was discussed by Drs. Hoskins, Ellis, and Tom Smith.

The "Question Box" was next on the program. The first question discussed was "Are Sera and Bacterins of Any Value in the Prevention or Cure of Canine Distemper?" Dr. Ellis stated that from his experience, he believed both had value as preventive and curative agents. Dr. H. K. Miller is uncertain of their value as a preventive but is daily favoring them more as a curative agent. Secretary J. E. Crawford has used them liberally for years with results that lead him to the conclusion that they have been of no value in his hands. Dr. T. B. Rogers believes we often use these remedies under misapprehension, believes the theory is correct but our information is not complete as to how they may best be used.

Lieut. John C. McTammany was present as a visitor and was askd by the Chair to address the

meeting. He recited some very interesting experiences while in the army. Among other things he told that he met only two people in France whom he knew, one being Major Clayton.

The question of the annual smoker of the Alumni Association of the Veterinary Schools of New York City was discussed, and it was decided that a smoker would be held this year and that since the society held its 25th anniversary in October, this social function be held in conjunction with it.

Dean Hoskins spoke of the pending state legislation affecting agricultural and veterinary problems; speaking particularly of the legislation taxing dogs, showing that an amount running close to a million dollars, has been collected in dog taxes during the past two years, on the plea of protecting the sheep industry, without spending a dollar of this money in employing experts to attack the real peril of the sheep industry; namely, external and internal parasites; the money so collected going to the firemen's pension fund.

Goshen, N. Y. J. F. DeVine.

April

Dr. Adolph Eichhorn, Pearl River, N. Y., gave a most interesting and valuable paper on prewar meat inspection and sanitary conditions of public abattoirs in various countries in Europe. The doctor gave a clear-cut description of the abattoirs of France, Germany and Austria-Hungary, his address being thoroughly enjoyed by the members and invoking an interesting discussion.

Dr. Eichhorn was followed by Dr. Harry Ticehurst, Morsemere, N. J., with a well written paper on necrobaccilosis in the army horses and mules. The doctor pointed out that this disease was the greatest menace that the army veterinarian had to deal with. He attributed the cause to the assembling of large numbers of animals in comparatively small areas with poor sanitation, the animals standing in mud and manure. The disease was more severe in the remounts than at the training camps due to better sanitary conditions at the latter. The treatment which proved most efficacious is the application over the whole affected part of a paste made by mixing equal parts of zinc sulphate and lead acetate with a little water. Silver nitrate solution (10%) was also found to be very effectual when applied twice daily. The chief seat of infection was generally the frog, and if not attended to promptly, the disease spread rapidly to the laminæ, coronary band, fetlocks and pasterns. Such cases frequently developed a general infection with septicemia following. The doctor augmented his paper with records of a number of cases that came under his notice when in the army service, stating that he had records of over three hundred cases of infected frogs which were removed and treated and quick recoveries made. In the second week of February, 1918, out of 6,000 animals in the remount station at that time, 1,743 were in the hospital, and of these 96 per cent were suffering from dermatitis and necrobaccilosis infection. This paper brought on an instructive discussion joined in by Drs. Berns, McKinney, Lowe and Dean Hoskins.

Major Ackerman was present and gave an interesting talk on his experience in the army service.

Dr. Cassius Way, chairman of the committee on arrangements for the state veterinary meeting to be held in Brooklyn this summer asked the members for their co-operation in making the meeting a success.

Dr. A. J. Allott, 309 West 70th Street, New York City, and Dr. W. H. Hayes, 129 E. 75th Street, New York City, were elected to membership in the association. A vote of thanks was extended to Dr. Eichhorn, Dr. Ticehurst and Major Ackerman for their contributions to the program of the evening.

J. Elliott Crawford, Sec.

Far Rockaway, N. Y.

May

Dr. Theo. Krey, of Detroit, Mich., was a welcome visitor and was asked to explain the comparatively new anesthetic known as apothesine. He said that the present knowledge of the drug indicates that it is not irritating to tissue and is nontoxic. It has been used with considerable satisfaction by some medical surgeons but its use by the veterinary profession up to the present time has been rather limited.

He suggested that it be used in solution of two to four per cent. and is anxious to get information from veterinary practitioners as to how satisfactory it proves in practice. An added advantage is, that it is not within the Harrison act and can be sold much cheaper than cocain. Its action is slower than cocain but seems quite as lasting, causing anesthesia for possibly two hours.

The next speaker was Lieut. Danzinger, who has been abroad with the 77th Division. He was followed by Capt. Chas. Chase. Both these gentlemen spoke modestly of their experiences.

Under "Case Reports." Dr. DeVine told of what to him seemed an unusual case of probably *superfecundation.* (The fertilization of two or more ova one after another during one estrual period.)

A single grade Jersey cow, which was "pasture bred" dropped an apparently normal calf on Jan. 1, 1919, and to all appearances the cow seemed normal, but on Jan. 12, 1919, the owner found another apparently new-born calf with the dam.

The things that seem strange about this case are that there is no proof of *superfecundation* since probably the same sire served the cow at

different periods, if she was served at different times of the same estrual period; the calves not indicating otherwise and the period between the dates they were dropped seemed to be of sufficient length to eliminate normal twin pregnancy and still at an interval lengthy enough to make it unusual in the cow since the cow normally has such a short estrual period; and again the interval between the birth of the two calves was too short to make it a probable case of superfetation (the second ovulation occurring in an animal already pregnant and the second ovum being fertilized by a second copulation). The general belief is that *superfecundation* does not occur in cows on account of the short estrual period as is rather frequent in the bitch with a long estrual period and Dr. DeVine asked if a case of positive *superfetation* had come under the notice of any of those present. None of those present had seen such a case but Dr. W. J. McKinney told of a very positive case of *superfetation* that he had seen many years ago in Europe. A purebred Shorthorn cow had been bred by accident to a scrub spotted-sire; three weeks later she showed heat and was bred to a purebred Shorthorn bull. In due time she gave birth to a black and white calf and three weeks later to a good type Shorthorn calf.

Dr. George Berns told of a pregnant bitch which was brought to his hospital during the night dying early in the morning. A postmortem examination was made some two hours after and the fetuses were still alive, indicating that fetal life may sometimes last a considerable time after the death of the mother.

Dr. Wm. H. Lowe expressed his interest in livestock and spoke enthusiastically of the many services the veterinary profession can give in breeding of animals. Dr. Robert McCully added much to the discussion by telling some of the difficulties and peculiar things met with in brood mares. Dr. Chas. Chase showed much interest in the subject by asking many practical questions on problems of sterility.

Dr. Gannett gave a case report of a horse with infected hock sheath. The case was operated on by cutting the tendon within the sheath giving splendid results which caused the doctor to suggest the advantage of tenotomy in perhaps other cases such as an infected navicular sheath, by cutting the tendons midway of the canon.

Dr. Ellis had a most interesting dog case to report. The case had been photographed and the doctor passed the photographs to the audience. The first photograph showed the dog with a twisted and distorted left hind leg, very much like a cork screw from the patella region down. The case was a chronic one when brought to the doctor and he advised breaking down the adhesions and setting the leg. The dog was put under an anesthetic, the adhesions broken down, the leg straightened and put in a cast for a month, with a splendid result and recovery as shown by the second photograph. The doctor also cited other cases showing what braces had done in giving mechanical support in addition to medication.

In speaking of dog practice, Dr. Gannett confessed his lack of familiarity with the many breeds of dogs and said that the March number of the National Geographical Magazine published at Hubbard Memorial Hall, Washington, D. C., was devoted to the subject of dogs and it was one of the best articles on the subject that had come to his notice.

Dr. Christian Rohrer exhibited a bladder of a female dog that had suffered with retention of the urine. A digital examination revealed a tumor of the vagina involving the meatus.

Dr. George Berns spoke of the death of the son of Dr. W. J. McKinney. This brave young man met his death in Switzerland on April 26th while on duty in the American Aviation Corps in attempting to determine if it is possible to use areoplanes in the mountainous regions of that country. Dr. McKinney who has been for years a member of this society and who is one of the kindest-hearted and best liked men in our profession, has the true sympathy of all his colleagues and a silent vote of regard and sympathy was extended by the society for the loss of this splendid and loyal young man as so many of us knew him to be.

The secretary was instructed to write a letter of protest to the president of the Society for Prevention of Cruelity to Animals making it known to him how objectionable and unfair to the practitioners of New York City, is the custom carried out by those in charge of their ambulances of very often when being called to remove a disabled animal from the street, taking such an animal to one of the humane hospitals instead of taking it to the owner's stable or his veterinarian's hospital as is desired by the owner and his veterinarian.

Goshen, N. Y. J. F. DeVine.

BACTERINS FOR INFECTIOUS KERATITIS

I note with interest in the June number an inquiry by C. E. B., Mich., and the reply by Dr. Baker relative to a condition of sheep supposed to be infectious keratitis, which possibly is analogous to this same malady in cattle. I have never met this condition in sheep, perhaps because there are very few sheep in this territory, but last summer I had an autogenous bacterin prepared from the secretions from the eyes of cattle thus affected. This bacterin was used by a few fellow veterinarians and myself with gratifying results. If this condition in sheep is positively infectious keratitis, I am of the opinion that an autogenous bacterin would be worth a trial.

New Liberty, Iowa. Henry Hell.

BICORNUAL PREGNANCY SUCCESSFULLY HANDLED

In the June issue, I noticed a case report by Dr. W. P. Bossenberger, in which he relates that he found it impossible to deliver the colt in a case of bicornual pregnancy in a mare. I have had no trouble with such cases.

I place the mare with her front feet elevated to about 25 to 30 degrees. A mare, if not too exhausted, can always be induced to stand up. Thereby the fetus falls back and comes within easy reach. If this is not sufficient, I put the mare in a sling, standing her in the same position as described above, putting an extra pad on the back part of the sling and applying pressure. This never fails to bring the fetus within reach and thus permit delivery.

To my knowledge, this method is not mentioned in any book on obstetrics.

Tottenville, N. Y. P. C. JUHL.

ARMY VETERINARY SERVICE

(*Continued from page* 348)

the United States, February 10, 1919, Major Clayton was transferred to the First Army headquarters as Assistant Chief Veterinarian, A. E. F., with station at Bar-sur-Aube, reporting on February 24, 1919. The First Army headquarters was officially disbanded on April 20th and Major Clayton returned to the United States with headquarters detachment of officers.

Upon his return, Major Clayton was ordered to Washington, D. C., for consultation with the veterinary division, Surgeon General's office, where he has given most valuab'e information and assistance based upon his wide experience during the war.

The following officers have been discharged from the Veterinary Corps, United States army during the past month:

Captain Howard C. Gale, who was on duty as veterinarian at A. R. D., Camp Sevier, S. C.

Captain F. G. Kneup, who has just returned from overseas.

Captain R. H. Schrecengost, who has just returned from overseas.

Captain F. D. Bertram.
Captain Wm. Brod.
Captain W. M. Decker.
Captain A. F Hasselbach.
Captain W. C. Pulsifer.
Captain A. Moore.
Captain I. Mevers.

The following first lieutenants have been discharged during the past month from the Veterinary Corps, United States Army:

F. C. Roach, H. A. Wilson, J. F. Rogers, L. M. Friedline, C. D. MacCormack, O. S. Pruner, E. C. Hughes, W. H. Empey, O. H. Crossland, R. S. Montgomery, Wm. F. Nolechek, A. D. Kammer, G. C. Bevan, B. E. Carlisle, W. E. Spierling, E. R. Worley, G. W. Swanger, D. L. Procter, L. L. North, J. T. Connelly, J. C. Wheat.

The following second lieutenants have been discharged during the past month from the Veterinary Corps, United States Army:

O. H. Welf, H. F. Oelschlager ,V. W. Myers, A. P. Sturrook, J. W. Herbott. J. M. Kerr, M. L. Brackbill, H. N. Eames, J. L. Franz, G. Gilbert, J. E. McCoy, Chas. Thigpen, L. B. Barber, A. E. Joseph, N. J. Pearce, A. J. Dickman, H. F. Lienhardt, C. C. Ettling, R. F. Smith. S. G. Lindsay, D. W. Nicholas, W. H. Hauer, H. B. Mitchell, G. L. Allen, H. P. Bonnikson, E. S. Ring, E. E. Lang, C. P. Lunneen. A. S. Martin, J. C. Quinlan, C. H. Leavitt, G. A. Hazel, J. L. Barringer, T. G. Kenney, J. F| Kane, M. E. Norman, F. E. Allen, R. T. Renwald, L. P. Crowe, T. H. Howe, P. S. Christman, J. A. Jensen, W. G. Lashbrook, D. J. MacLeod, G. A. Tucker, C. E. Morford. C. C. Pemberton.

Second lieutenants Calvin H. Bennett and John Von Henry Schantz, have resigned from the veterinary corps, regular army, during the past month.

The death of Capt. Alexander G. Fraser, V. C. N. A., at Walter Reed General Hospital is recported.

OFFICERS, VETERINARY CORPS, UNITED STATES ARMY

	On duty May 11, 1919.	On duty June 11, 1919.
Colonels	0	0
Lieutenant Colonels	2	5
Majors	75	74
Captains	173	193
First Lieutenants	462	430
Second Lieutenants	503	432
Total	1215	1126

Veterinary Corps Promotions, A. E. F.

The following majors have been promoted to the grade of lieutenant colonel:

H. E. Bemis. L. A. Merillat, Sr., Reuben Hilty.

The following captains have been promoted to the grade of major:

J. B. Lentz. W. C. White, H. B. F. Jervis, R. W. Smith, W. F. Guard.

The following 1st lieutenants have been promoted to the grade of captains:

E. S. Warner. J. E. Weigen. H. R. Wise, D. E. Sisk. J. H. Allen. J. J. Ash. H. V. Baker, E. E. Black, R. B. Bolton. J. D. Eastwald, M. S. Esslinger. C. M. Gilchrist. I. O. Gladdish, R. H. Glenn, F. B. Green, R. A. Halsey, J. I. Handley, W. H. Haskell, L. A. Hock, P. H. Hudgins. R. K. Knighton. L. E. Moore, T. F. O'Dea. H. E. Pitts, H. G. Vanderroest, B. C. Bridges, B. H. Dunkley, W. D. Odou, C. S. Parker, W. M. Weldishefer, H. P. Gill.

The following second lieutenants have been promoted to the grade of first lieutenants:

T. E. West. E. M. Rundahl. H. L. Ragsdale, E. L. Peck. B. C. Murtv. F. F. McNeely. A. F. Meredith. J. M. Lloyd. E. P. McBane, L. J. Lewis. C. J. Lambert. O. I. Holloway. J. R. Grigsby, A. Freer. W. France. M. E. J. Evans. C. H. Doepel. F. Cross. F. E. Cleaver. F. E. Clark. F. E. Carroll, R. A. Branson, M. E. Agnew,

John McBirney, C. A. Beall, D. S. Harper, W. H. Williamson, D. M. Smith.

Promotions in United States:

2nd Lt. M. J. Harkins to grade of 1st lieutenant

1st Lt. W. H. Houston to grade of captain.

TRANFERS AND ASSIGNMENTS OF VETERINARY OFFICERS.

Major George H. Dean, V. C., from A. R. D., Camp Wheeler, Ga., to A. R. D., Camp Meade, Md., for duty as veterinarian.

Major Robert C. Musser, V. C., from duty as camp veterinarian, Camp Lee, Va., to Walter Reed General Hospital, Washington, D. C., for observation and treatment, at the expiration of 3 months' sick leave.

Major Chas. H. Jewell V. C., U. S. A., who has just returned from overseas, where he was assigned as Chief Veterinarian, 9th Army Corps, has been directed to report to the Surgeon General of the Army for temporary duty in his office.

Major E. W. Hogg, V. C., from duty at Camp Dix, N. J., to Washington, D. C., for temporary duty in the office of the Surgeon General: Major Hogg has just returned from overseas, where he has been serving as division veterinarian, 79th Division.

Captain Edward J. Williams, V. C., from Camp Logan, Texas, to Camp Custer, Mich., for duty as camp veterinarian.

Captain Will C. Griffin, V. C., from Camp Harry J. Jones, Douglas, Ariz., to Camp Fort Bliss, Texas, for duty as camp veterinarian.

Captain Thomas S. Hickman, V. C., from A. R. D., Camp Shelby, Miss., to A. R. D., Camp Kearny, Calif., for duty as veterinarian.

Captain, N. M. Crawford, V. C., from duty at Chicago, Ill., to Presidio of San Francisco, Calif., for duty as veterinarian.

Captain P. F., Galloway, V. C., from duty at A. R. D., Camp Hancock, Ga., to A. R. D., Camp Funston, Kan., for duty as veterinarian.

Captain G. B. Huse, V. C., from duty at Camp Veterinary Hospital, Camp Lee, Va., to Camp Lee, Va., for duty as camp veterinarian.

Captain J. L. Hartman, V. C., from duty at A. R. D., Camp MacArthur, Texas, to Chicago, Ill., for instruction in meat inspection.

Captain Jerry L. Ruble, V. C., from A. R. D., Fort Bliss, Texas, to A. R. D., Camp Gordon, Ga., for duty as veterinarian.

Captain C. C. Whitney, V. C., from duty at Department Laboratory, Cen. Dept., Fort Leavenworth, Kan., to Fort San Houston, Texas, for duty in Dept. laboratory, that station.

Captain J. J. Essex, V. C., from present duty at Camp Meade, Md., to duty as camp veterinarian that station.

Captain H. H. Beeman, V. C., from Camp Meade, Md., to A. R. D. 318, Camp Sherman, Ohio, for duty as veterinarian.

Captain O. J. Counzelman, V. C., from Camp Custer, Mich., to Fort Robinson, Neb., for duty as veterinarian.

Captain Joseph E. Hodge, V. C., who has just returned from overseas, where he served as division veterinarian, 29th Division, has been ordered to Camp Benning, Ga., for duty as veterinarian.

Captain Fred D. Green, from Camp Dix, N. J., to Kelly Field, San Antonio, Texas, for duty as veterinarian.

1st Lieut. J. P. Gerety, V. C., from A. R. D., Camp Sevier, S. C., to A. R. D., Camp Upton, N. Y., for duty.

1st Lieut. W. E. Campbell, V. C., from A. R. D., Camp Shelby, Miss., to A. R. D., Fort Bliss, Texas, for duty.

1st Lieut. M. L. Cline, V. C., from duty, A. R. D., Camp MacArthur, Texas, to Chicago, Ill., for instruction in meat inspection.

1st Lieut. G. H. Conn, V. C., from A. R. D., Camp Zachary Taylor, Ky., to A. R. D., Camp Sherman, Ohio, for duty.

1st Lieut. J. G. Fuller, from duty with the 8th Cavalry, Marfa, Texas, to Big Bend District, Marfa, Texas, for duty as veterinarian.

1st Lieut. S. A. Kamis, V. C., from A. R. D., Camp Bowie, Texas, to A. R. D., Camp Travis, Texas, for duty.

1st Lieut. O. E. Gladfelter, V. C., from duty at Chicago, Ill., to San Juan, Porto Rico, for duty as veterinarian.

1st Lieut. E. C. Martindale, V. C., from camp veterinary hospital, Camp Lee, Va., to A. R. D., Camp Lee, Va., for duty.

1st Lieut. R. E. Oliver, V. C., from Camp Dix, N. J., to Newport News, Va., Port of Embarkation, for duty.

1st Lieut. F. H. K. Reynolds, V. C., from duty at Dept. Laboratory, Southeastern Dept., Fort McPherson, Ga., to Fort Leavenworth, Kan., for duty in Dept. Laboratory, that post.

1st Lieut. W. L. Herbert, V. C., from A. R. D., Camp Meade, Md., to Fort Clark, Texas, for duty with the 13th Cavalry.

2nd Lieut. C. W. Barrett, V. C., from A. R. D., Camp Kearny, Calif., to A. R. D., Fort Bliss, Texas, for duty.

2nd Lieut. G. W. Rawson, V. C., from A. R. D., Camp Wheeler, Ga., to A. R. D., Camp Travis, Texas, for duty.

2nd Lieut. R. S. Whitney, V. C., from A. R. D., Camp Sevier, S. C., to A. R. D., Camp Upton, N. Y., for duty.

2nd Lieut. J. R. Houchins, V. C., from Camp Holabird, Md., to Camp Bragg, N. C., for duty as assistant to the camp veterinarian.

2nd Lieut. O. C. Schwalm, V. C., from A. R. D., Camp Shelby, Miss., to Camp San Fordyce, Texas, for duty.

2nd Lieut. F. R. Pettys, V. C., from A. R. D., Camp Shelby, Miss., to Hachita, N. M., for duty with the 12th Cavalry.

2nd Lieut. J. S. Davis, V. C., from Camp Sherman, Ohio, to Camp Zachary Taylor, Ky., for duty as assistant to the camp veterinarian.

2nd Lieut. R. T. Seymour, V. C., from A. R. D., Camp Hancock, Ga., to Fort Clark, Texas, for duty at that post.

2nd Lieut. H. Schreck, V. C., from A. R. D., Camp Hancock, Ga., to A. R. D., Fort Sill, Okla., for duty.

2nd Lieut. F. J. Resmenylder, V. C., from duty with U. S. troops, San Juan, Porto Rico, to Chicago, Ill., for duty at U. S. General Hospital No. 32.

2nd Lieut. J. Nichols, V. C., from Camp Veterinary Hospital, Camp Lee, Va., to A. R. D., Camp Lee, Va., for duty.

2nd Lieut. M. E. Norman, V. C., from A. R. D., Fort Bliss, Texas, to Marfa, Texas, for duty with the 8th Cavalry.

2nd Lieut. T. W. Sprosser, V. C., from Camp Dodge, Iowa, to A. R. D., Camp Funston, Kan., for duty.

2nd Lieut. A. F. Malcolm, V. C., from A. R. D., Camp Funston, Kan., to A. R. D., Camp Meade, Md., for duty.

2nd Lieut. C. A. Moore, V. C., from A. R. D., Fort Bliss, Texas, to Fort Bliss, Texas, for duty with the 5th Cavalry.

2nd Lieut. E. K. Rogers, V. C., from A. R. D., Camp Lewis, Wash., to Fort Robinson, Neb., for duty.

2nd Lieut. T. R. Boyer, V. C., from Camp Dix, N. J., to Marfa, Texas, for duty with the 8th Cavalry.

2nd Lieut. L. E. Miller, from Camp Dix, N. J., to Front Royal, Va., for duty as assistant to the veterinarian.

2nd Lieut. J. W. Morgan, V. C., from duty at Chicago, Ill., to Camp Lewis, Wash., for duty as assistant to the camp veterinarian.

Veterinary Corps Inspects Italian Beef

First Lt. A. H. Legenhausen, camp meat and dairy inspector, Camp Gordon, Ga., has called our attention to the following very complimentary mention of the veterinary corps meat inspection service in *Army and Navy Register.*

At the request of the U. S. Food Administration, meat division, of New York City, the army veterinary corps has been placed in charge of inspection of all beef purchased in this country by the Italian Government. Aided by the Food Administration, 30,000 tons of frozen beef have recently been purchased for shipment to Italy as fast as it can be inspected and boats are available. This inspection is to determine soundness, compliance with U. S. army specifications as to quality and all other details. The meat is inspected at seaboard just prior to loading. Up to this time 16,375,055 pounds have been inspected, out of which 2,449,915 pounds were rejected for not complying with specifications as to quality and condition. This purchase is made with money loaned by the U. S. Government, and both the treasury department and the Italian ministry of agriculture and food agreed that the protection afforded by the army veterinary inspection would be necessary. Such a request is, indeed, a high compliment to the efficiency of the army veterinary service. The meat inspection division of the veterinary corps has been completely organized during the war for the first time and now functions as an integral part of the sanitary service. It has full charge of the inspection of all meats and meat products purchased by the packing house products branch of the subsistence department at points of purchase, transshipment points and at places of issue. Every pound of fresh meat shipped to American troops in France was inspected in the veterinary corps. To realize the importance and the volume of work being done by this inspection force it is of interest that an average of 14 to 19 million pounds of meats and meat products were being purchased weekly at the time the armistice was signed.

The many Chicago friends of Major John Blattenberg were delighted with a recent visit from him. The major had received his discharge from the army and was outfitting himself with "civies" preparatory to taking off his uniform for the last time.

The commencement issue of "Orange and Blue," a publication of the senior class of the Alabama Polytechnic Institute, Auburn, Ala., contains a long article about the College of Veterinary Medicine. From it we learn that three of its alumni, who were officers of the Veterinary Corps, and one undergraduate, died in military service, as follows:

Dr. Armstrong Hill, '10, 1st Lieut., V. C., died in France. Dr. Hill volunteered in 1917 and after several months at Camp McClellan was ordered overseas with his division. He was in practice at Talladega for several years.

Dr. S. G. Carter, '15, 2nd Lieut., V. C., died at Fort Oglethrope. Dr. Carter was on the city meat and milk inspection staff at Chattanooga, Tenn., when called to duty.

Dr. J. R. Ballou, '16, 2nd Lieut., V. C., died in France. Dr. Ballou was in practice at Ozark when called to duty and was among the very first to go overseas.

Neil Ford-Ex. '19. Neil volunteered with the Fourth Alabama in 1917, saw service on the border and later went overseas with his regiment. He was killed at Chateau Thierry by an exploding Hun shell on the night of July 26, 1918.

Approximately one-half of the 139 graduates of the College of Veterinary Medicine were in the military service.

The *Army* and *Navy Journal* recently contained the following concerning the importance of keeping up the cavalry arm of the military service.

Airplane No Substitute For Cavalry

The cavalry is still as necessary and important and a branch of the army as it was in the days before trench warfare, according to the opinion of an officer of the General Staff who has long been recognized as an army authority on the cavalry arm. In spite of the reversal to trench warfare and the advance in the use of the airplane this officer is emphatic in his statement that the United States should maintain its cavalry, because there can be no guarantee that warfare in the future will follow the tac-

tics of the present. He pointed out that it has always been a fallacy of army leaders to base their plans for a new army on their latest engagement rather than upon a danger in the future which can be reasonably apprehended. Some duties of the cavalry which cannot be discharged by airplanes in the new style of warefare also remain to be performed in time of war. This officer pointed out that until the airplane can come into use as an effective fighting arm against enemy troops, until it can be used as a means for rushing forward reinforcements, and until it can be used for reconnoissance at night, it cannot supersede the cavalry. It can help greatly in daylight reconnoitering, but its operations are always limited. He cited several examples of notable work accomplished by cavalry during the war with Germany, indicating that even during trench warfare there may be times when intelligent and timely co-operation of horse troops is invaluable. The signal success attained by General Allenby against the Turks in Palestine, finally resulting in Turkey's complete withdrawal from the field, is largely attributed to his cavalry action. Important examples of cavalry action took place at all stages of the war, from the time that the German Uhlans swept across Belgium to Namur as a mask for the Infantry to the action of the two American troops following the reduction of the St. Mihiel salient. The Italians participated in brilliant cavalry maneuvering when the Austrians were trapped by the flooded Piave, and also during the retreat. In commenting upon the work of the American cavalry during the war, this officer bore out the general opinion that there were few opportunities for American horse troops to participate in action, as nearly all cavalry regiments had been transferred into field artillery or machine gun troops. He declared, however, that the training of the cavalryman in the American Army is such that the trooper is virtually an infantryman on horseback, and that he is as capable in fighting with a rifle on the ground as if his training had been in the infantry branch. It is thus doubly advantageous, he insists, for the United States to maintain its cavalry organizations, emphasizing the necessity for preparing the army for every eventuality that seems reasonable rather than preparing the defenses of the country to fight over again the war just concluded.

At the meeting of the American Medical Association at Atlantic City, June 9-14, 1919 the medical department of the army had an elaborate exhibit which included a veterinary division where were shown a series of types of chests of articles used in the army veterinary service and charts, maps and photographs showing its work in the care of horses and mules. Charts were presented showing the non-effective and death rates among horses and mules for the American expeditionary forces and in the United States and also the death rate from glanders. Phases of the inspection and transportation of meat and meat food products were also shown in photographs. Types of chests shown were: Those issued to veterinary hospitals containing surgical instruments, to hospitals of capacity of 1,000 animals, with contents, those containing miscellaneous veterinary supplies as issued to hospitals; those containing dental instruments, veterinary field unit chest issued to mobile troops and camp organizations and field chest issued to each veterinary officer in the field. There was also shown the officers wallet issued to veterinarians on field duty and the wallet issued to each farrier.

Dr. J. W. Herbott received 18 copies of the Journal during the time he was overseas. To quote "Even when letters from home and all other mail seemed to go astray, the AMERICAN JOURNAL OF VETERINARY MEDICINE always came over the top and was looked for and enjoyed not only by me but also by others of the Veterinary Corps who were with me."

Dr. Chas. D. Owens of Westpoint, Indiana, is with the army of occupation in Germany.

Major John H. Gould, chief veterinarian of the Third Army is stationed in Coblenz, Germany. He says that for months he was worried over the possibility of being returned to the U. S. A. without seeing the Rhine but now that he has seen it he would rather go and look at the good old Mississippi any time.

In a circular of information concerning enlistments issued by the medical department of the army it is stated that for those who prefer service with the veterinary corps, instruction is provided in veterinary medicine and surgery; practical experience in the care of animals and the prevention of disease. Ample veterinary equipment is provided at mounted posts, remount depots, etc.

Two general fields of instruction are offered, with opportunities for a limited number of men to receive training along special lines.

The two general fields are,—first, veterinary service connected with animal transports and mounted troops; second, meat and milk inspection service.

In the care and treatment of our Army animals, completely-equipped veterinary hospitals offer class and practical instruction in animal management; veterinary hygiene and sanitation; materia medica and pharmacy; feeds and feeding; veterinary first aid, which includes elementary instruction in veterinary anatomy, medical clinics and minor surgery; horseshoeing; horsemastership and equitation; and clerical work.

Veterinary Corps men serving with troops are always mounted. This service offers the advantage of the mounted branches of the Army and gives a useful training at the same time. It should particularly appeal to young men engaged in agriculture and stock-raising. The veterinary organizations are stationed wherever our forces go. The handling of animals necessitates mostly out-door work and is of a pleasant nature.

Special training is offered for a limited number of qualified men as laboratory assistants. This work pertains to laboratory diagnosis, microscopy, bacteriology and pathology and the preparation of veterinary biologics.

The meat and milk inspection service offers special training for men who desire to become proficient in this line of work. Trained men are needed as assistants to Army Veterinary Meat and Milk Inspectors, stationed in the packing house and shipping centers, army cantonments and permanent army posts and districts.

A practical school of instruction is maintained in one of the largest packing house centers. Instruction is given by lectures. demonstrations and actual work. It includes lectures on transmission of disease by milk and meat products, demonstration of various laboratory tests and performances of such tests by the students; inspection of pasteurizing plants, milk depots, packing and slaughtering plants and actual meat inspection.

This service covers inspection of fresh beef, mutton, pork and veal, canned and cured meats, lard and lard substitutes, oleomargarin, butter, cheese, and eggs. Trained enlisted men also assist in supervising the selection, grading, covering, weighing, stamping, refrigerating, loading and storing of fresh meats. Men who receive this training are always in demand, after completing their Army service.

The enlisted force of the Medical Department consists of master hospital sergeants, hospital sergeants, sergeants first class, stable sergeants, sergeants, corporals, cooks, horseshoers, saddlers, mechanics, wagoners, privates first class, and privates.

The enlisted force of the Veterinary Corps consists of sergeants first class, sergeants, corporals, cooks, horseshoers, farriers, saddlers, wagoners, privates first class, and privates.

Lieut. L. M. Friedline of Jonesboro, Ind., who recently received his discharge from the army at Camp Sherman, Ohio, has opened a veterinary hospital at Upland, Ind.

Dr. Charles S. Secoy, formerly of Athens, Ohio, and now first lieutenant in the U. S. army veterinary corps, has been transferred from Texas to Corozal, Canal Zone.

Dr. J. W. Minton, who was in the army veterinary service at San Antonio, Texas, has received his discharge, and located for practice at at Winlock, Washington.

Dr. Charles Lentis of Paloma, Ill., has been discharged from the army and gone into private practice. He was recently appointed an assistant state veterinarian.

Dr. Robt. Learmonth has associated himself in practice with Dr. Carl Olson at Sac City, Iowa. Dr. Learmonth joined the Canadian veterinary corps in December, 1914 and was attached to the field artillery with the rank of sergeant. He went overseas in June, 1915, and stayed in the service over three years, seeing some hard fighting. He returned to Canada in November, 1918, and resumed the course in veterinary medicine where he had left off at the Ontario Veterinary College, from which he recently graduated.

Dr. R. B. Jones has returned from the army and resumed his practice at Charlotte, N. C.

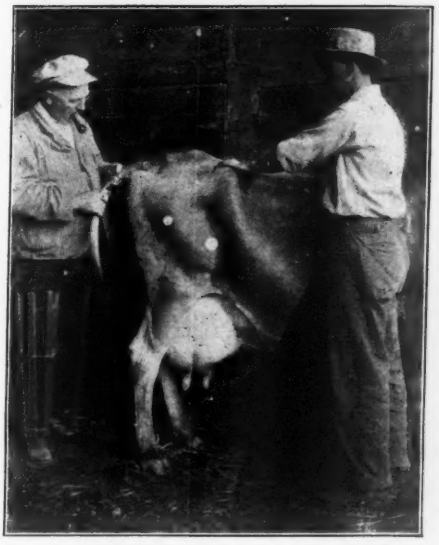
Dr. Orin Crossland, who was among the boys in the first draft, has been discharged from the service and resumed his practice at Athens, Ill.

Captain Alexander G. Fraser, aged 33, of the veterinary corps, U. S. army, died at Fort McHenry hospital, Baltimore, May 23rd, after an illness of several weeks with leukemia. He was a graduate of the Ohio State university, class of 1909, and had been in the army for the past three years, serving on the Mexican border and later at various army posts.

Dr. M. A. Brothers, formerly of Kirksville, Mo., and recently discharged from the army after being in the service eighteen months, has located for practice at Savanna, Ill.

Dr. J. R. Snyder has been discharged from the army and has taken over the practice of Dr. C. E. Brewer at Gordon, Nebraska. He has also been appointed state live stock inspector.

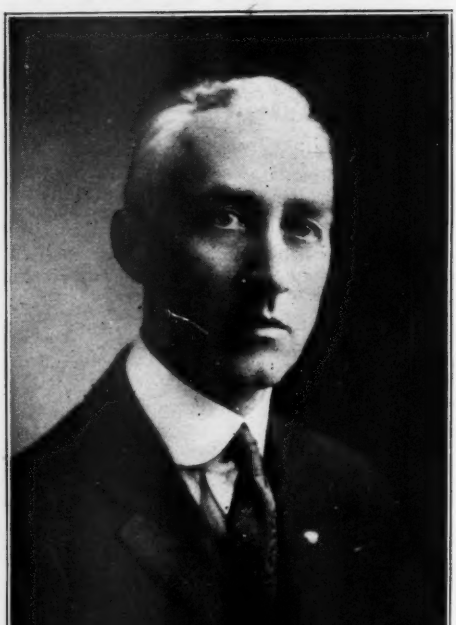
Dr. Charles C. Dobson, who after his return from army service in France spent some weeks in the hospital at Ft. Benjamin Harrison under observation for influenza complications, is now back in practice at New Augusta, Ind.



Anti-cow kickers for sterility work and tuberculin testing in cows; may be used for protection against mad dogs as well.

DR. DYKSTRA BECOMES DEAN

The board of administration of the Kansas State Agricultural College has created a division of the department of veterinary medicine, and Professor R. R. Dykstra, former head of the



department, becomes dean of the new division. The importance of the school of veterinary medicine as a part of the state agricultural college is much enhanced by this change, which among other things will permit the payment of higher salaries to members of the faculty.

JOIN YOUR ASSOCIATION

A few days ago a young man from the northern part of the state, whom I had advised to enter the veterinary profession and who has now been in practice for about four years, dropped in to see me. I said, "How are you doing?" He replied, "Good," and thanked me for getting him started right. I asked if he belonged to the state association, and he said "Yes," and that he had his application in for membership in the A. V. M. A. He said that when he heard the state association was to meet he debated whether to sacrifice the time and money to attend, but that the deciding factor which influenced him to go was that he had noticed that the best men he knew in the state were members and always attended, so he concluded that if it was good for them, it certainly would be to his benefit to join and attend.

Now, this is the moral: the best men belong; join your local, state and national associations and be one of the best. It is needless to add that this young man has made good.

When this young man asked my advice regarding his entering the veterinary profession, I advised him to do so because I knew him and had taken notice of his business methods. He was a blacksmith and had conducted successfully for a number of years a large shop. He knew how to meet the public in a business way, make out his statements monthly and collect them with a minimum of friction. He had a keen, alert mind, was a member of several societies and attended their meetings and social functions, took an interest in the civic affairs of the town and, last but not least, was a good horseman and accustomed to handling stock and liked it. Also he was not a high-school graduate. Now don't infer that I consider the lack of a high-school diploma a recommendation, but the point I wish to make is that the possession of a high-school diploma is not always an absolute essential to the making of a good, successful veterinarian.

Pomona, Cal. JOHN L. TYLER.

Intoxicating Bread

The question of intoxicating bread has an indirect interest for the veterinarians. At the meeting of the Iowa State Veterinary Association in Cedar Rapids, Iowa, I called attention to the supposed toxic action of Fusarium and some work which had been done in Europe. I have before me an excellent resume of a paper on intoxicating bread by N. A. Naum. The resume is by Shapovalov and is published in Phytopathology.* Considerable attention has been given in recent years by the Russian pathologist to an epiphytotic of cereals, known locally as drunk bread or intoxicating bread ascribed to certain species of Fusarium. He submits evidence to show that this, the phenomenon of "drunk bread," is caused by either of two species of *Fusarium,* namely the *F. roseum* its ascus stage *Gibberella Saubinetii* and *F. subulatum.* The mycelium occurs inside of the grain tissues which can be proved either microscopically or by germinating the seed.

A. Tomasski made a study of the chemical changes. The detailed study of the toxic substance is left to a future report. It is interesting to note that the Chinese recognized this disease many years ago and named the diseased grains *mi-chun.* L. H. PAMMEL.

Your valued Journal is the best publication obtainable on veterinary science, and I hope you will continue to send it without a break in the time.—C. W. R., Idaho.

*7: 384-386.